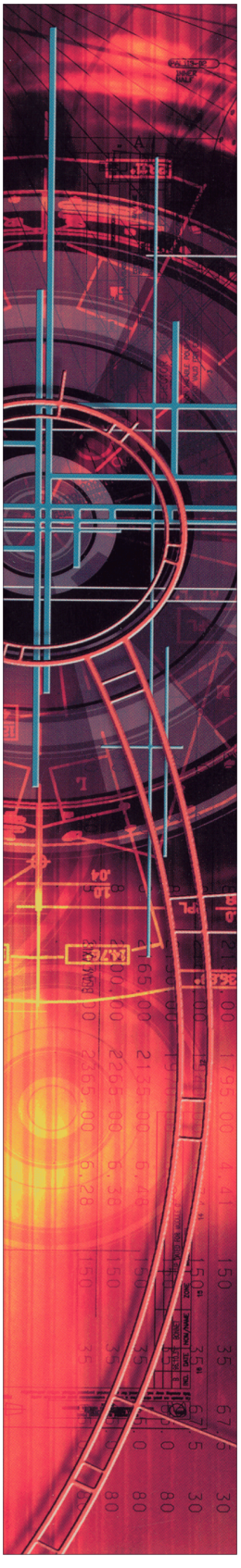

McDATA Corporation

SPHEREON 4500

McDATA Sphereon™ 4500 Fabric Switch Product Manager User Manual

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REV A

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620-000158-200	4/2003	Updates for EFCM 7.1

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Preface

This publication provides details for using the Sphereon™ 4500 Fabric Switch Product Manager application to monitor, control, and configure operation for a specific Sphereon 4500 switch. You must access the Product Manager application for the switch through the EFC Manager application.

Who Should Use This Manual

This publication is intended for data center administrators, LAN administrators, operations personnel, and customer support personnel who must monitor and manage product operation.

Organization of This Manual

This publication is organized as follows:

Chapter 1, *Product Manager Overview* provides an introduction and overview of the switch Product Manager. It is intended as a quick reference for using features available through the main Product Manager window.

Chapter 2, *Monitoring and Managing the Switch*, describes how to monitor and manage switch operation using the Product Manager. This includes status indicators, menu options, dialog boxes, and performance and error data available through the *Hardware View*, *Port List View*, *FRU List View*, *Node List View*, and *Performance View*.

Chapter 3, *Configuring the Switch*, describes how to configure the switch using options available through the Product Manager's *Configure* menu.

Chapter 4, *Using Logs*, describes how to access and use logs through the Product Manager's *Logs* menu.

Chapter 5, *Using Maintenance Features*, describes how to use the maintenance options available for the switch through the Product Manager's *Maintenance* menu.

Chapter 6, *Optional Features*, describes features that you can configure through the product manager by enabling purchased feature keys. Details on the Open Systems Management Server and the SANtegrity™ Binding features are included.

Appendix A, *Product Manager Messages*, lists and explains error messages that may appear while using the Product Manager.

The *Glossary* defines terms, abbreviations, and acronyms used in this manual.

An *Index* is also provided.

Manual Updates

Check the McDATA web site at www.mcdata.com for possible updates or supplements to this manual.

Related Documentation

Other publications that provide additional information about the Sphereon 4500 Switch are:

- *McDATA Enterprise Fabric Connectivity Manager User Manual* (620-005001)
- *McDATA Sphereon 4500 Fabric Switch Installation and Service Manual* (620-000159)
- *McDATA Products in a SAN Environment - Planning Manual* (620-000124)
- *McDATA FC-512 Fabricenter Equipment Cabinet Installation and Service Manual* (620-000100)
- *McDATA OPENconnectors SNMP Support Manual* (620-000131)
- *McDATA OPENconnectors Command Line Interface User Manual* (620-000134)

Manual Conventions

The following notational conventions are used in this document:

NOTE: A note presents important information that is not hazard-related.

CAUTION

A caution statement provides essential information or instructions for which disregard or noncompliance may result in personal injury, equipment damage, or a loss of data.

WARNING

A warning statement provides essential information on instructions for which disregard or noncompliance may result in death, sever personal injury, or substantial equipment damage.

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1

Product Manager Overview

This chapter is an introduction and overview of the Sphereon 4500 Fabric Switch Product Manager application. It is intended as a quick reference for using features available through the main Product Manager window.

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Managing the Sphereon 4500 Fabric Switch

The following options are available for managing the Sphereon 4500 Fabric Switch through a user interface:

- The Product Manager application installed on an EFC Server. Access to the Product Manager must be through the EFC Manager applications. These applications are installed on the EFC Server as shipped from the manufacturer.
- The Product Manager application installed on a customer-supplied server platform that meets specific requirements. Contact your McDATA representative for these requirements when ordering this option, called EFCM Lite.

  You must also access the Product Manager through the EFC Manager application. All three applications are shipped on a software CD as EFCM Lite for installation on your server platform when you order this option. In contrast to applications installed on the EFC Server, EFCM Lite does not include support for the following features:

  — The call-home feature.

  — The automatic ZIP drive backup feature through Iomega® QuikSync.

  — The ability to download remote clients from the server or a website. You must install clients on remote workstations from the software distribution disk provided with this management option.
- The SANpilot™ interface. Using a browser-capable PC with an internet connection to the switch, you can monitor and manage the switch through the SANpilot interface embedded in the switch firmware. The interface provides a GUI similar to the Product Manager application, and supports switch configuration, statistics monitoring, and basic operation.

  To launch the SANpilot interface, enter the switch's IP address as the internet uniform resource locator (URL) into any standard browser. Enter a user name and password at a the login screen. The browser then becomes a management console. Refer to the web server interface online help for details on use.

NOTE: The default user name for the right to view status and other information is "Operator." The default user name for the right to modify configuration data, perform maintenance tasks, or perform other options is "Administrator." The default password for both user names is "password."

- Management using simple network management protocol (SNMP). An SNMP agent is implemented through the Product Manager application that allows administrators on SNMP management workstations to access product management information using any standard network management tool. Administrators can assign Internet Protocol (IP) addresses and corresponding community names for up to six workstations functioning as SNMP trap message recipients. Refer to the *McDATA OPENconnectors SNMP Support Manual* (620-000131) for more information.

This manual provides details on the Product Manager application for the Sphereon 4500 Fabric Switch only. Also use this manual if you have EFCM Lite installed on a customer-supplied server platform (except for those features listed in the preceding paragraphs that are not supported by this option). This manual does not cover the SANpilot Interface.

EFC Management Menu Options

This user's guide provides information on the McDATA Sphereon 4500 Product Manager application only. Information on the EFC Manager application is provided in the *McDATA Enterprise Fabric Connectivity Manager User Manual* (620-005001). Following are lists of options available under the menu bar in all applications. References are provided to the correct publication for detailed information on these options.

EFC Manager

Following are options available through the EFC Manager. For more information, refer to Chapter 3 of the *McDATA Enterprise Fabric Connectivity Manager User Manual* (620-005001).

View Tabs

- *Products*
- *Fabrics*

Product Menu

- *New*
- *Open*
- *Delete*
- *Modify*
- *Properties*
- *Logout*
- *Exit*

Fabrics Menu

- *Rename*
- *Persist Fabric Topology*
- *Unpersist Fabric Topology*
- *Export Fabric Topology*
- *Show Route*
- *Hide Route*
- *Show Zone Members*
- *Show View Port*
- *Show Fabric Tree*

- *Enterprise Fabrics Mode* (active if SANtegrity™ Binding features are installed)
- *Fabric Binding* (active if SANtegrity™ Binding features are installed)

View Menu

- *User Sessions*
- *Zoom*
- *Arrange Icons*
- *Layout Icons*
- *Center in Topology*
- *Refresh Topology*
- *Clear ISL Alert*
- *Clear All ISL Alerts*
- *Enable Fly Over Display*

Configure Menu

- *Users*
- *Nicknames*
- *Sessions*
- *SNMP Agent*
- *Activate Zone Set*
- *Zoning Library*
- *Advanced Zoning*

Logs Menu

- *Audit Log*
- *Event Log*
- *Session Log*
- *Product Status Log*
- *Fabric Log*

Maintenance Menu

- *Configure E-Mail*
- *Test Remote Notification*
- *Configure Ethernet Events*
- *Configure Call Home Event Notification*

Help

- *Contents*
- *About*

Product Manager

Following are options available through the Product Manager application for your switch. For more information on these options, refer to *Menu Bar* on page 1-15 in this manual.

View Tabs

- *Hardware*
- *Port List*
- *Node List*
- *Performance*
- *FRU List View*

Product Menu

- *Port* (options available when port is selected)
- *FRU*
- *Clear System Error Light*
- *Enable Unit Beaconing*
- *Properties*
- *Close*

Configure Menu

- *Identification*
- *Operating Parameters*
- *Switch*
- *Fabric*
- *Switch Binding*
  - — *Change State* (only active if SANtegrity Binding is installed)
  - — *Edit Membership List* (only active if SANtegrity Binding is installed)

- *Ports*
- *SNMP Agent*
- *Management Server*
- *Features*
- *Date/Time*
- *Threshold Alerts*
- *Open Trunking* (option active if Open Trunking is installed)
- *Export Configuration Report*
- *Enable Web Server*
- *Enable Telnet*

Logs Menu

- *Audit Log*
- *Event Log*
- *Hardware Log*
- *Link Incident Log*
- *Threshold Alert Log*
- *Open Trunking Log* (only active if Open Trunking feature is installed)

Maintenance Menu

- *Port Diagnostics*
- *Data Collection*
- *IPL*
- *Set Online State*
- *Firmware Library*
- *Enable E-Mail Notification*
- *Enable Call Home Notification*
- *Backup and Restore Configuration*
- *Reset Configuration*

Help Menu

- *Contents*
- *About*

Product Manager Description

The Product Manager for the Sphereon 4500 Fabric Switch is a Java-based graphical user interfaces (GUI) that provides in-depth management, configuration, and monitoring functions for individual switches and their field-replaceable units (FRUs).

In contrast to the Product Manager, the EFC Manager enables administrators to monitor operational status for all products and Fibre Channel fabrics managed by an EFC Server. The EFC Manager also provides tools to administer user and product access to the EFC Manager and Product Manager. Refer to the *McDATA Enterprise Fabric Connectivity Manager User Manual* (620-005001).

The Product Manager provides graphical views of switch hardware components and displays of component status. By positioning the cursor on icons, graphics, panels, and other visual elements in these views and clicking the left or right mouse button, you can quickly manage and monitor the switch on your network.

Access the switch Product Manager by double-clicking any switch product icon on the EFC Manager's *Products View* or the *Topology* tab of the *Fabrics View*.

You can install the EFC Manager and Product Manager applications on remote workstations, as shown in Figure 1-1, using any standard web browser. For instructions, refer to the appendix in the *McDATA Enterprise Fabric Connectivity Manager User Manual* (620-005001) that pertains to the operating system of your workstation.

Install the EFCM Lite on a customer-supplied server platform using the instructions provided with the applications for that platform.

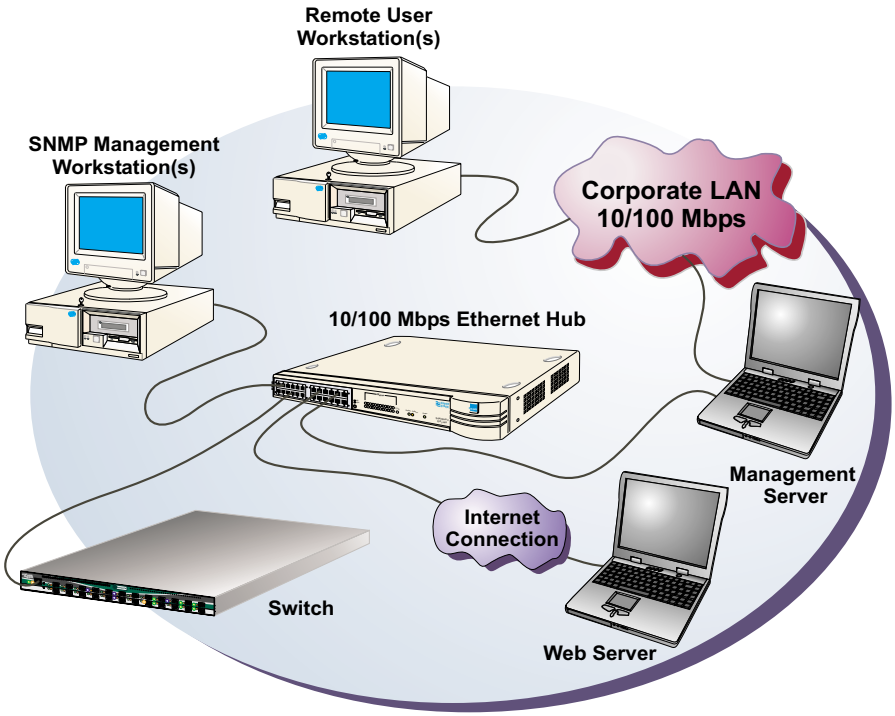


Figure 1-1 EFC Server and Remote Workstation Configuration (Dual Ethernet)

Using the Product Manager, you can:

- Back up and restore configuration data.
- Clear the system error indicator.
- Configure Fibre Channel operating parameters for the fabric, such as, R_A_TOV, E_D_TOV, switch priority, and interop mode; and for switch, such as, preferred and insistent domain ID, rerouting delay, and domain RSCNs.
- Configure individual ports with a port name describing the node attached to the port.
- Configure keys for new features.
- Configure interoperability mode for open switch fabrics.
- Configure LIN alerts.

- Configure nickname to display instead of WWN for switch and attached nodes.
- Configuring port binding and port speed.
- Configure SNMP trap recipients and community names.
- Configure Switch Binding if optional SANtegrity Binding feature is installed.
- Configure Open Trunking if optional OpenTrunking feature is installed.
- Configure Open Systems Management Server features (if installed).
- Configure the switch name, location, description, and contact person.
- Control individual Fibre Channel ports by blocking/unblocking operation, enabling LIN alerts and port binding, and running internal and external loopback diagnostics.
- Display field replaceable unit (FRU) properties such as the FRU name, physical position in the switch (chassis slot number), active failed state, part number, and serial number.
- Display information for individual Fibre Channel ports, such as the port name, port number, Fibre Channel address, operational state, type of port, and login data.
- Display information on nodes attached to ports.
- Display port performance and statistics.
- Display vital product data for the switch, such as the system name, description, contact person, location, status, model number, firmware and EC level, and manufacturer.
- Enable beaconing for ports and the switch unit.
- Monitor the operational status of the switch and each of its hardware field-replaceable units.
- Perform an initial program load (IPL).
- Perform maintenance tasks for the switch including maintaining firmware levels, administering the Call-Home feature, accessing the switch logs, and collecting data to support failure analysis.

NOTE: Call-Home may not be available if you are using a customer-supplied server platform for the EFC Management applications.

- Reset port operation.
- Run port diagnostics.
- Set the date and time on the switch.

Using the Product Manager

This section provides a general overview of the Product Manager and its functions. For details on performing specific tasks and using specific dialog boxes, refer to the appropriate chapters in this manual.

Keyboard Navigation

Use standard keyboard navigation in dialog boxes. For example, use the **Tab**, arrow, and backspace keys to move through dialog box fields and the **Enter** key to perform default button functions.

Using Dialog Boxes

Buttons such as *OK*, *Activate* and *Close* or *Cancel* initiate functions in a dialog box. There is a difference between the *OK* and *Activate* buttons. The *OK* button saves the data you entered and closes the dialog box. The *Activate* button saves the data you entered without closing the dialog box, unless there is a *Close* button in which case, *Activate* saves the information without closing the box. There is also a difference between the *Close* and *Cancel* buttons. The *Close* button closes the dialog box and saves the data you entered. The *Cancel* button cancels the operation and closes the dialog box without saving the information you entered.

Illustrations Used in this Manual

Figures containing EFC Manager and Product Manager screens in this manual are included for illustration purposes only. These illustrations may not match exactly what you see through your server or workstation. Title bars have been removed from the illustrations and fields in the illustrations may contain different data than in screens displayed on your system.

Logging Into the EFC Manager

To open the Product Manager, you must first log into the EFC Manager.

1. Perform one of the following steps:
   - If you are using the EFC Server, the EFC Manager application automatically starts when you power on or reboot the EFC Server. If you reboot or switch on the EFC Server and the EFC Manager login screen displays, skip to step 3 to log in.
   - If you are using a remote user workstation, follow steps 2 through 5.
   - If the EFC Manager window displays already, skip to *Opening the Product Manager* on page 1-14.
2. Perform one of the following steps if you are using a remote user workstation (a network PC with a remote client installed) and the EFC Manager login screen or EFC Manager window is not displayed. If the login screen is displayed, go to step 3.
   - Start the EFC Manager and display the login screen by double-clicking the EFC Manager icon on the desktop.

Figure 1-2 EFC Manager Icon

   The EFC Manager login screen displays.
   - If the EFC Manager window is open (Figure 1-3) and you need to log in as another user or access a different EFC Server, select *Logout* from the *Logout* or *Logout/Exit* menu on the menu bar to display the login screen. Go to step 3.
3. When the EFC Manager login screen displays, enter your user name and password. The default user name is *Administrator* and password is *password* unless changed by your system administrator.

NOTE: The default user name for the right to view status and other information is "Operator." The default user name for the right to modify configuration data, perform maintenance tasks, or perform other options is "Administrator." The default password for both user names is "password."

NOTE: If the EFC Manager window is open (Figure 1-3) and you need to log in as another user or access a different EFC Server, select *Logout* from the *Logout* or *Logout/Exit* menu on the menu bar to display the login screen.

4. In the *EFC Server* box on the login screen select the EFC Server where you want to connect. Note that if you are logging into an EFC Server locally, *localhost* is the EFC Server name. Type in the network address of the server if it is not in the list.
5. Click *Activate* or press the **Enter** key on your keyboard.

   The main *EFC Manager* window displays showing the *Product View*.

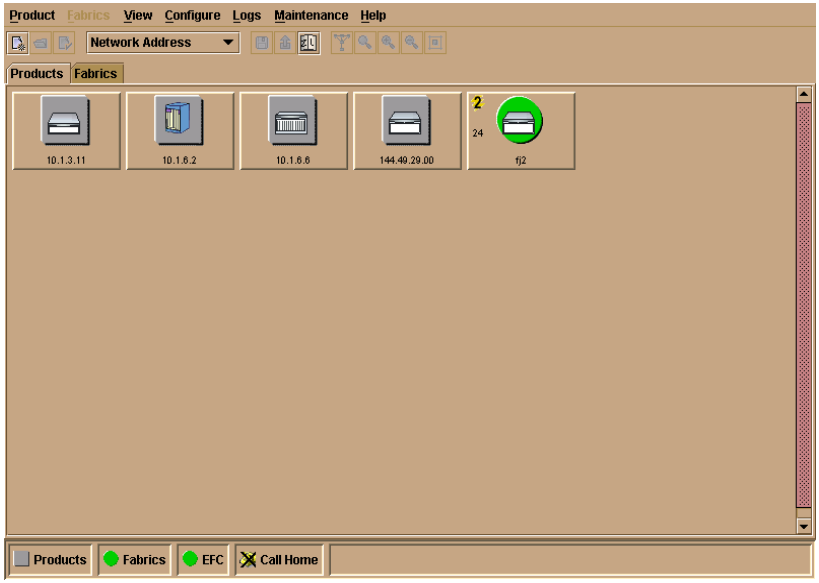


Figure 1-3 Main EFC Manager Window

Opening the Product Manager

To open the Product Manager, double-click the product icon in the *Product View* or right-click the icon and select *Open*.

Figure 1-4 Sphereon 4500 Fabric Icon

The Product Manager displays showing the default *Hardware View*. Figure 1-5 shows the Sphereon 4500 Fabric *Hardware View*.

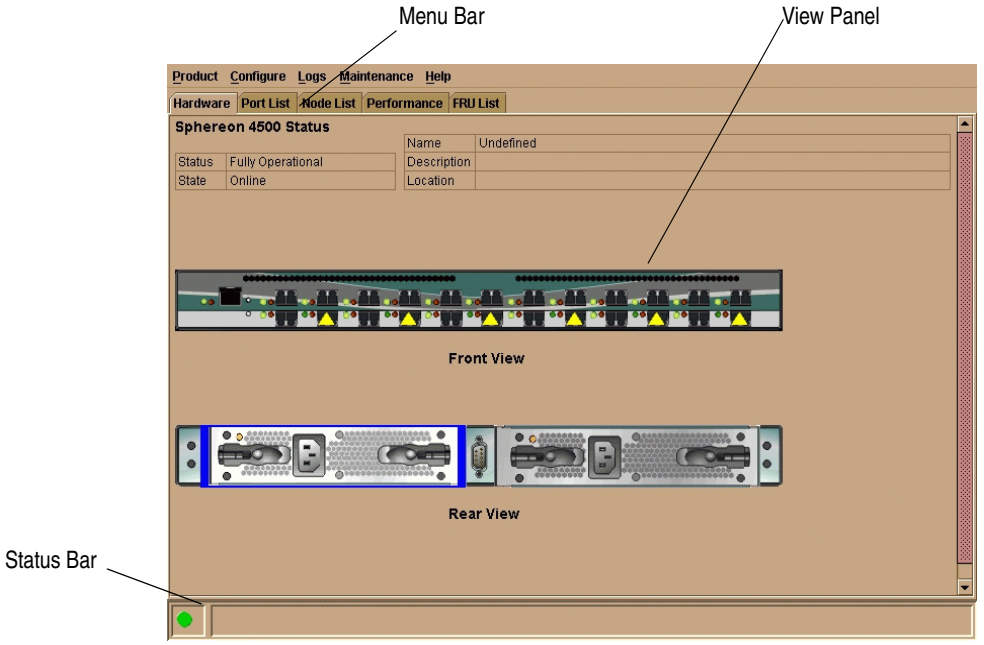


Figure 1-5 Sphereon 4500 Fabric Product Manager Window

NOTE: The EFC Manager window is still available as a separate window. You can drag the Product Manager window away from the EFC Manager window and view both windows on your PC desktop or minimize one or both of them to icons if desired. You can have a maximum of four Product Manager windows open concurrently.

Window Layout and Function

The main Product Manager window is divided into four main areas as shown in Figure 1-5 on page 1-14: menu bar, view tabs, view panel, and status bar. Use features in these panels to configure switch operation, monitor performance, and access maintenance features.

Menu Bar

The menu bar on the Product Manager window displays the following menus:

- *Product*
- *Configure*
- *Logs*
- *Maintenance*
- *Help*

Click one of the tabs to display a list of menu options. Click an option to open a dialog box that allows you to perform configuration and maintenance tasks and view logs. If a menu option contains a check box, click in the box to add a check mark and enable a function. Click a check box containing a check mark to remove the check mark and disable the function.

Product Menu

Select one of the following options from the *Product* menu.

Port

This provides a secondary port menu only when the *Hardware View*, *Port List View*, or *Performance View* displays in the view panel. To use this menu for a specific port, click a port in the *Hardware View*, a port's row in the *Port List View*, or a port's bar graph in the *Performance View*. The menu contains options which are identical to those that display when you right-click the port, port row, or port bar graph in those views. For detail on these options refer to *Port Menu* on page 2-17.

FRU

Click a power supply module/fan in the *Hardware View* only and select *FRU* from the *Product* menu to display the *FRU Properties* menu option. These displays the properties dialog box for the FRU. The *FRU Properties* dialog box can also be displayed when you double-click the FRU in the *Hardware View*. For details on these options refer to *Displaying FRU Information* on page 2-7.

Clear System Error Light

Select this to turn off the amber system error LED, located below the green/blue power LED on the switch front bezel.

Enable Unit Beaconing

Click the check box to toggle unit beaconing on or off. When the check box has a check mark, unit beaconing is on, and the amber system error light on the switch front bezel blinks to help users locate the actual unit in an equipment room. When you click the check box to remove the check mark, unit beaconing is disabled and the amber LED goes out. You can only enable beaconing if there are no system errors (the system error light is off).

Properties

Click to display the *Switch Properties* dialog box. This dialog box contains the switch name, description, location, and contact person configured through the *Configure Identification* dialog box. Also included is other product information as detailed in Switch Properties. You can also display this dialog box by double-clicking an area on the illustration in the *Hardware View*, away from a hardware component.

Close

Select this option to close the Product Manager window.

Configure Menu

Click on the *Configure* menu on the menu bar to display a menu that lists the following options. For detailed information on using these options, refer to Chapter 3, *Configuring the Switch*.

Identification

Select this option to display the *Configure Identification* dialog box. Enter the following information in this dialog box:

— *Name* - Assign a product name. Note that you can set this name as the nickname for the switch's WWN, using the *Set Name as Nickname* check box. The nickname then displays instead of the WWN in Product Manager views.

— *Description* - Assign a unique product description.

— *Location* - Describe the product's location.

— *Contact* - Assign a contact either by name, phone number, or e-mail address.

NOTE: This information displays in the identification table at the top of the *Hardware View* and in the EFC Manager *Product View,* if the *Product View* is configured to display names.

Operating Parameters

This option offers the ability to configure switch and fabric parameters.

Use the *Switch Parameters* dialog box to set parameters on the switch for fabric operation. Set other fabric operating parameters, such as preferred domain ID (1 to 31), Domain RSCNs, and Suppress RSCNs on Zone Set Activations. In addition, you can also enable the rerouting delay feature. Refer to *Configure Switch Parameters* on page 3-3 for more information on configuring the switch priority and rerouting delay.

Use the *Fabric Parameters* dialog box to set parameters for fabric operation. In this dialog box, you can set the resource allocation time-out value (R_A_TOV) and error detect time-out value (E_D_TOV) in tenth-of-a-second increments, as well as other fabric operating parameters, such as switch priority level (*Principal*, *Default*, or *Never Principal*) and interop mode. You must take the switch offline through the *Set Online State* dialog box to configure these parameters.

Switch Binding

This submenu provides two options if the SANtegrity Binding feature is installed through the *Configure Feature Key* dialog box: *Change State* and *Edit Membership List*. Selecting *Change State* displays the *Switch Binding State Change* dialog box where you can activate Switch Binding according to a specific connection policy (Restrict E_Ports, Restrict F_Ports, or All Ports). *Edit Membership*

List allows you to create a list of switches and devices that you want to allow exclusively to attach to switch ports. For details, refer to *Configure Switch Binding* on page 3-9.

Ports

Select this option to display the *Configure Ports* dialog box. For each port you can provide a name, block or unblock operation, enable LIN alerts for each port, enable Fabric Address Notification (FAN), define a type (G, F, E, Gx, and Fx), configure port binding, define port speed and enable port binding.

NOTE: Ports are automatically configured as G_Ports if no device is connected, F_Ports if a device is connected, E_Ports if a switch is connected, and FL_Port if connected to a loop device.

SNMP Agent

Select this option to display the *Configure SNMP* dialog box. Use this dialog box to configure network addresses and community names for up to six SNMP trap recipients. Also authorize write permissions to enable SNMP management stations to modify writable MIB variables. In addition, you can enable authorization traps to be sent to management stations when unauthorized stations request access to switch SNMP data.

Management Server

Select this option to display the *Configure Open Systems Management Server* dialog box, if this feature is enabled for the switch. Use this to configure an open systems inband management program to function with the switch. To use these procedures, you must have enabled the Open Systems Management Server through the *Configure Feature Key* dialog box.

Features

Displays the *Configure Feature Key* dialog box. Use this dialog box to enter a feature key to enable optional features that you have purchased for the switch.

Date and Time

Select this option to display the *Configure Date and Time* dialog box. Use this option to set the current date and time in the switch. When the *Periodic Date/Time Synchronization* check box is checked, the *Date and Time* fields are greyed out (disabled), and the EFC Server date and time periodically synchronizes the switch date

and time. If the *Periodic Date/Time Synchronization* check box is not checked, you can set the date and time in the dialog box fields manually.

Threshold Alert(s)

Select this option to configure threshold alerts for ports. A threshold alert notifies users when the transmit (Tx) or receive (Rx) throughput reaches specified values for specific switch ports or port types (E_Ports F_Ports, or FL_Ports). Using this option, you can configure:

— A name for the alert.

— A threshold type for the alert (Rx, Tx, or either).

— Active or inactive state of the alert.

— Threshold criteria. This includes configuring the threshold as the percent of port traffic capacity utilized (*% utilization)*. You must also configure the time interval during which the throughput is measured and the maximum cumulative time that the throughput percentage threshold can be exceeded during this time interval before an alert is generated.

Open Trunking

Select this option to enable the optional OpenTrunking feature. This feature monitors the average data rates of all traffic flows on ISLs (from a receive port to a target domain), and periodically adjusts routing tables to reroute data flows from congested links to lightly loaded links and optimize bandwidth use. The feature can be installed through the *Configure Feature Key* dialog box. For details, refer to *OpenTrunking* on page 6-12.

Export Configuration Report

Select this option to display the *Export Configuration Report* dialog box, which enables you to specify a file name in which to save an ASCII text file containing all current user-definable configuration options in a printable format. Note that this file cannot be read back into the Product Manager in order to set configuration parameters.

Enable Web Server

Select this option place a check mark in the check box to enable the SANpilot Interface on the switch. Select the option again to remove the check mark and disable the SANpilot Interface. When disabled, users at remote workstations cannot access the interface.

Enable Telnet

Select this option place a check mark in the check box to enable the telnet access to the switch. Select the option again to remove the check mark and disable the telnet access. When disabled, users at remote workstations cannot use telnet to access the switch.

Logs Menu

Place the cursor over the *Logs* menu to display a menu that lists the following options. For detailed information on using these dialog boxes, refer to Chapter 4, *Using Logs*.

Audit Log

This log provides a record of all configuration changes made on the switch. Each entry displays the date and time of the change, a description of the change, the source of the change (such as the EFC Server or SNMP management station), and an identifier for the source, such as the IP address of the EFC Server or SNMP management station.

Event Log

Select this option to display the switch event log. This log provides a record of significant events that have occurred on the switch, such as hardware failures, degraded operation, and port problems. Each entry includes the date and time of the event, a reason code for the event, the severity level, a brief description, and up to 32 bytes of supplementary event data. Refer to the *McDATA Sphereon 4500 Fabric Switch Installation and Service Manual* (620-000159) for more information.

Hardware Log

This log displays information on FRUs inserted and removed from the switch. Each log entry includes the name of the FRU inserted or removed, the slot position relative to identical FRUs installed, whether the FRU was inserted or removed, the FRU part number and serial number, and the date and time the FRU was inserted or removed.

Link Incident Log

The link incident (LIN) log displays the most recent incidents with their date and time, port number, and description of the incident. A link incident can be one of several conditions detected on a fiber optic link. For a list of events that may cause a link incident to be written to the log, refer to *Link Incident Log* on page 4-9.

Threshold Alert Log

This log provides notifications of threshold alerts. Besides the date and time that the alert occurred, it also displays information that was configured through the *Configure Threshold Alert(s)* option under the *Configure* menu. This includes the alert name, port for which the alert is configured, the type of alert (transmit throughput, receive throughput, or both), threshold utilization of traffic capacity, minutes the threshold was configured for, and the configured time interval for the threshold. For more details on this log, refer to *Threshold Alert Log* on page 4-11.

Open Trunking Log

This log provides details on Flow Rerouting through switch ports. Refer to *Open Trunking Log* on page 6-16 for details.

Maintenance Menu

Click on the *Maintenance* menu on the menu bar to display a list of the following options. For detailed information on using these dialog boxes, refer to Chapter 5, *Using Maintenance Features*.

Port Diagnostics

This option displays the *Port Diagnostics* dialog box. Use this dialog box to run internal and external loopback tests on ports. Refer to the *McDATA Sphereon 4500 Fabric Switch Installation and Service Manual* (620-000159) for instructions.

Data Collection

This option displays the *Save Data Collection* dialog box. Use this dialog box to collect maintenance data into a file. This file is used by support personnel to diagnose system problems. Refer to the *McDATA Sphereon 4500 Fabric Switch Installation and Service Manual* (620-000159) for instructions.

IPL

Select this option to initiate an initial program load on the switch. A dialog box displays to allow you to confirm the IPL. Note that an IPL does not affect any configuration settings done through the Product Manager. This operation does not interrupt port operation.

Refer to the *Execute an IPL* on page 5-2 for more information.

Set Online State

Select this option to display the *Set Online State* dialog box. Use this dialog box to change the online state of the switch to offline or online.

Firmware Library

Select this option to display the *Firmware Library* dialog box. This dialog box displays all firmware versions currently installed on the EFC Server that can be downloaded to switches. Use this dialog box to add a new firmware version to the EFC Server hard disk, modify the description displayed for an existing version, delete a version from the PC, or download (send) a version for operation on a switch. For additional information on using this option, refer to the *McDATA Sphereon 4500 Fabric Switch Installation and Service Manual* (620-000159).

Enable E-Mail Notification

The Simple Mail Transfer Protocol (SMTP) server and e-mail recipient addresses are configured in the EFC Manager application (not in the switch's Product Manager). E-mail notification is also initially enabled in the EFC Manager for all switches managed by the EFC Manager. Note, however, that the *E-Mail Notification* option on the Product Manager's *Maintenance* menu must be enabled (checked) for e-mail notification to occur for the specific switch.

The default setting for the *Enable E-Mail Notification* function is enabled (checked). To disable the function, select *Enable E-Mail Notification* from the *Maintenance* menu to clear the check box.

For additional information on using this option, refer to *Enable E-Mail Notification* on page 5-6.

Enable Call Home Notification

NOTE: The default setting for the *Enable Call Home Notification* function is disabled (unchecked).

Select *Enable Call Home Notification* from the *Maintenance* menu to enable the call-home function for the switch.

The parameters of the call-home feature are configured in Windows. Refer to the *McDATA Sphereon 4500 Fabric Switch Installation and Service Manual* (620-000159) for instructions.

At the bottom of the EFCM Fabric Manager window is an icon that indicates whether the Call Home feature is enabled. An X over the telephone icon indicates that the Call Home feature is disabled in the product manager or in the EFC Manager.

NOTE: The call-home feature may not be available if you are using a customer-supplied server platform for the EFC Management applications.

Backup & Restore Configuration

Select this option to save the product configuration stored on the switch to the EFC Server hard disk or to restore the configuration data from the EFC Server. Only a single copy of the configuration is kept on the server.

This backup is primarily for single-CTP systems, where a backup is needed to restore the configuration data to a replacement CTP card. You cannot modify the location or the file name of the saved configuration.

For additional information on using this option, refer to *Backing Up and Restoring Configuration Data* on page 3-32.

NOTE: You can only restore the configuration to a switch with the same IP address.

Reset Configuration

Select this option to reset all switch configuration data back to the factory defaults. A confirmation dialog box displays with a warning upon selecting the option. For additional information on using this option, refer to *Reset Configuration* on page 5-9.

CAUTION

This operation resets all configuration including any optional features that have been installed. You will need to re-enter your feature key to enable all optional features after resetting the configuration.

Help Menu

Click on the *Help* menu on the menu bar to display a list of the following options.

Contents

Select this option to display the *Help* window. The *Help* window contains *Contents*, *Index*, and *Glossary* buttons and hypertext--linked items to help you quickly navigate through information. Use the forward (>) and back (<) buttons to scroll forward and backward through the displayed help frames. Exit the help feature at any time by clicking the *Close* icon at the top of the *Help* window.

About

Select this option to display the version number for the Product Manager and copyright information.

View Tabs

Click one of the view tabs across the top of the Product Manager window to display the following views in the *View* panel.

- *Hardware*
- *Port List*
- *Node List*
- *Performance*
- *FRU List*

View Panel

Views, selected from the view tabs, display under the tabs in the view panel.

Hardware View

The *Hardware View* is the default view that displays in the view panel when you open the switch Product Manager. To return to this view from another view, click the *Hardware View* tab. Refer to Figure 1-6 on page 1-25 for an example of this view.

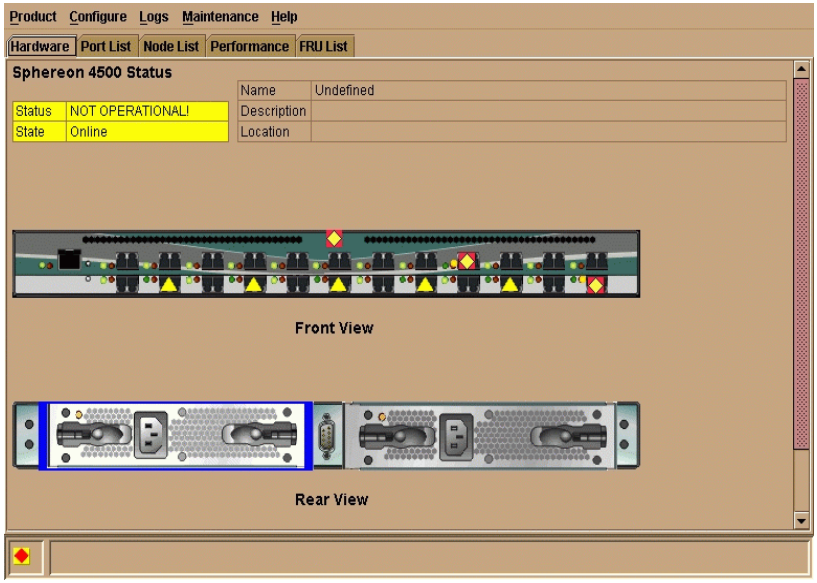


Figure 1-6 Hardware View

In the *Hardware View*, colored indicators reflect the status of actual LEDs on the switch FRUs. The status bar displays a symbol to represent the most degraded status currently reported by any of the switch FRUs. For example, for a port failure, indicated by a blinking red and yellow diamond on a port, a yellow triangle displays on the status bar to indicate a degraded condition. However, if a blinking red and yellow diamond displays over both power supplies, the status bar displays a blinking red and yellow diamond, which indicates a failure requiring immediate attention. For an explanation of the different status symbols and the reasons they display in the *Hardware View* or *Port List View*, refer to the table under *Monitoring Hardware Operation* on page 2-5.

Switch Menu

Double-click the switch graphic away from a FRU to display the *Switch Properties* dialog box. Right-click a hardware graphic away from a FRU to display the following options:

- *Switch Properties*
- *Enable Unit Beaconing*
- *Clear System Error Light*

- *IPL Switch*
- *Set Switch Date and Time*
- *Set Switch Online State*

For details on menu options, refer to *Switch Menu* on page 2-13.

For details on navigating and monitoring via the *Hardware View*, refer to *Hardware View* on page 2-2.

Port Menu

Double-click a port to display the *Port Properties* dialog box.
Right-click a port to display the following options:

- *Port Properties*
- *Port Technology*
- *Block Port*
- *Enable Beaconing*
- *Port Diagnostics*
- *Clear Link Incident Alert(s)*
- *Reset Port*
- *Port Binding*
- *Clear Threshold Alert(s)*

Note that these same options are available when you click a port on the *Hardware View* and select the port secondary menu from the *Product* menu on the menu bar.

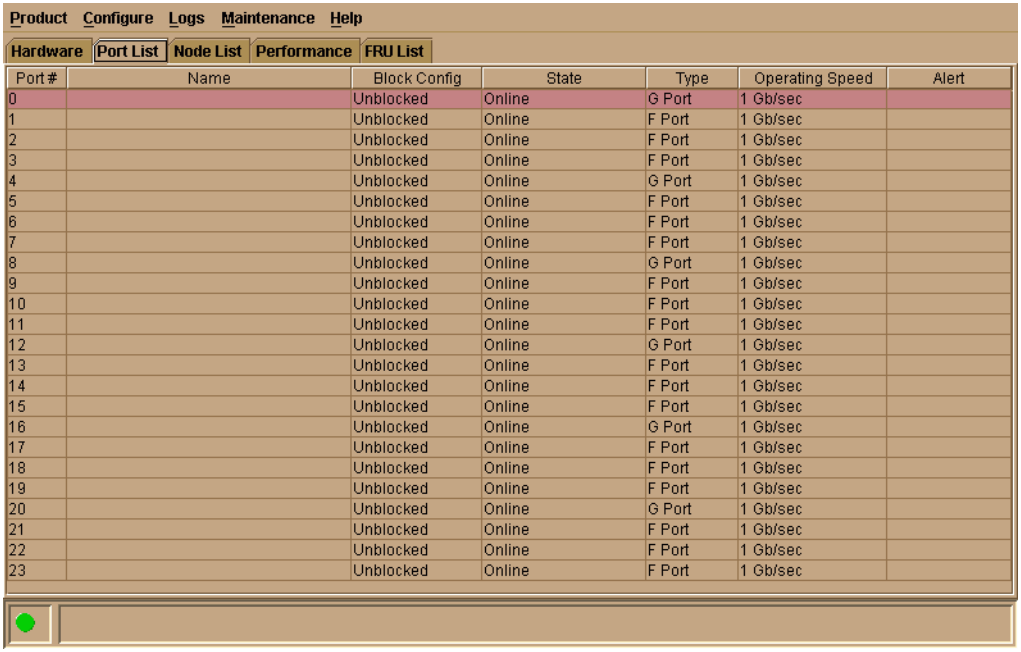
NOTE: For *Node Properties*, if a node is not logged in a message box displays indicating that node information is not available.

For details on menu options, refer to *Port Menu* on page 2-17.

For details on navigating and monitoring via the *Hardware View*, refer to *Hardware View* on page 2-2.

Port List View

Select the *Port List View* tab. Displays a table (Port List View) of data on all Fibre Channel ports in the switch. This data includes the port number, port name, blocked configuration state, operational state (such as online or failed), type of port, and any link incident alerts. Figure 1-7 shows an example of the *Port List View*.



Port #	Name	Block Config	State	Type	Operating Speed	Alert
0		Unblocked	Online	G Port	1 Gb/sec	
1		Unblocked	Online	F Port	1 Gb/sec	
2		Unblocked	Online	F Port	1 Gb/sec	
3		Unblocked	Online	F Port	1 Gb/sec	
4		Unblocked	Online	G Port	1 Gb/sec	
5		Unblocked	Online	F Port	1 Gb/sec	
6		Unblocked	Online	F Port	1 Gb/sec	
7		Unblocked	Online	F Port	1 Gb/sec	
8		Unblocked	Online	G Port	1 Gb/sec	
9		Unblocked	Online	F Port	1 Gb/sec	
10		Unblocked	Online	F Port	1 Gb/sec	
11		Unblocked	Online	F Port	1 Gb/sec	
12		Unblocked	Online	G Port	1 Gb/sec	
13		Unblocked	Online	F Port	1 Gb/sec	
14		Unblocked	Online	F Port	1 Gb/sec	
15		Unblocked	Online	F Port	1 Gb/sec	
16		Unblocked	Online	G Port	1 Gb/sec	
17		Unblocked	Online	F Port	1 Gb/sec	
18		Unblocked	Online	F Port	1 Gb/sec	
19		Unblocked	Online	F Port	1 Gb/sec	
20		Unblocked	Online	G Port	1 Gb/sec	
21		Unblocked	Online	F Port	1 Gb/sec	
22		Unblocked	Online	F Port	1 Gb/sec	
23		Unblocked	Online	F Port	1 Gb/sec	

Figure 1-7 Port List View

The *Port List View* displays information about all ports installed in the switch. All data is dynamic and updates automatically. Double-click any row in this view to display the *Port Properties* dialog box for the port.

Right-click a port row to display the same menu options that display when you right-click a port in the *Hardware View* or a port's bar graph in the *Performance View*. These include:

- *Port Properties*
- *Port Technology*
- *Block Port*
- *Enable Beaconing*
- *Port(s) Diagnostics*
- *Clear Link Incident Alert(s)*
- *Reset Port*
- *Port Binding*

- *Clear Threshold Alert(s)*

Note that these options are also available when you click a port row and select the *Port* secondary menu from the *Product* menu on the menu bar.

For details on these menu options, refer to *Port Menu* on page 2-17.

For details on navigating and monitoring via the *Port List View*, refer to *Port List View* on page 2-21.

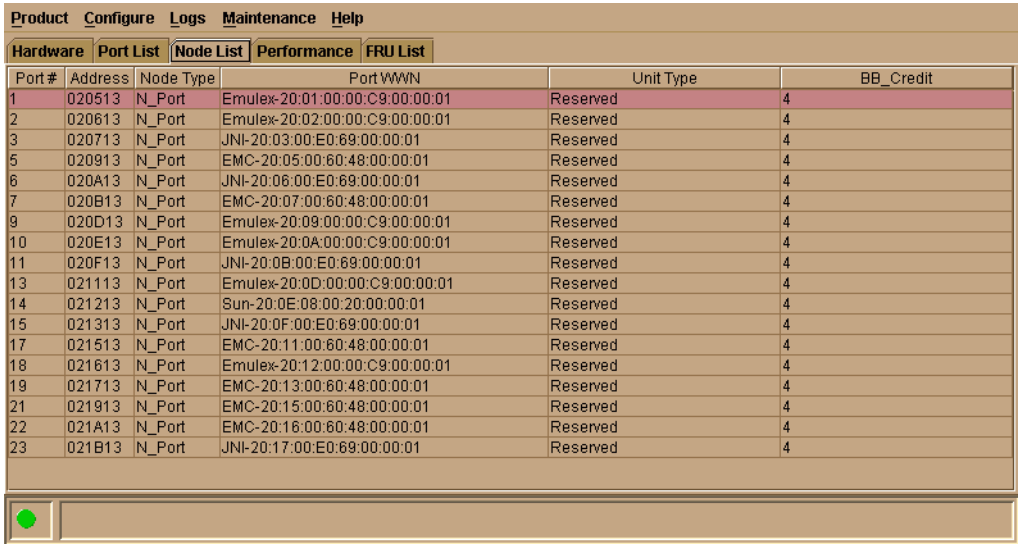
Node List View

Select *Node List* from view tabs. Figure 1-8 on page 1-29 shows an example of the *Node List View*. Displays a table of information (Node List View) about the node attachments to existing ports, sorted by port number. Information includes the switch port number, port or node addresses, node type, port world wide name, unit type, and BB_Credit.

Double-click a port row to highlight it and display the *Node Properties* dialog box for that port.

Right-click a port row to display the following menu options:

- *Node Properties*: Displays the *Node Properties* dialog box.
- *Port Properties*: Displays the *Port Properties* dialog box.
- *Define Nickname*. Displays the *Define Nickname* dialog box, where you can define a nickname to display for the attached device instead of the device's 8-byte WWN.
- *Display options*. Allows you to display attached devices listed under the *Port WWN* column in the *Node List View* by the device's nickname configured through the *Define Nickname* menu option or the device's WWN.



Port #	Address	Node Type	Port WWN	Unit Type	BB_Credit
1	020513	N_Port	Emulex-20:01:00:00:C9:00:00:01	Reserved	4
2	020613	N_Port	Emulex-20:02:00:00:C9:00:00:01	Reserved	4
3	020713	N_Port	JNI-20:03:00:E0:69:00:00:01	Reserved	4
5	020913	N_Port	EMC-20:05:00:60:48:00:00:01	Reserved	4
6	020A13	N_Port	JNI-20:06:00:E0:69:00:00:01	Reserved	4
7	020B13	N_Port	EMC-20:07:00:60:48:00:00:01	Reserved	4
9	020D13	N_Port	Emulex-20:09:00:00:C9:00:00:01	Reserved	4
10	020E13	N_Port	Emulex-20:0A:00:00:C9:00:00:01	Reserved	4
11	020F13	N_Port	JNI-20:0B:00:E0:69:00:00:01	Reserved	4
13	021113	N_Port	Emulex-20:0D:00:00:C9:00:00:01	Reserved	4
14	021213	N_Port	Sun-20:0E:08:00:20:00:00:01	Reserved	4
15	021313	N_Port	JNI-20:0F:00:E0:69:00:00:01	Reserved	4
17	021513	N_Port	EMC-20:11:00:60:48:00:00:01	Reserved	4
18	021613	N_Port	Emulex-20:12:00:00:C9:00:00:01	Reserved	4
19	021713	N_Port	EMC-20:13:00:60:48:00:00:01	Reserved	4
21	021913	N_Port	EMC-20:15:00:60:48:00:00:01	Reserved	4
22	021A13	N_Port	EMC-20:16:00:60:48:00:00:01	Reserved	4
23	021B13	N_Port	JNI-20:17:00:E0:69:00:00:01	Reserved	4

Figure 1-8 Node List View

Note that these options are also available when you click a port row, then select the *Port* secondary menu from the *Product* tab on the menu bar.

For details on navigating and monitoring via the *Node List View*, refer to *Node List View* on page 2-26.

Performance View

Select the *Performance* view tab. Figure 1-9 shows an example of the *Performance View*. This view provides a graphical display of performance for all 24 ports. The top portion of the *Performance View* displays bar graphs that show the level of transmit/receive activity for each port. This information updates every five seconds. Each bar graph also shows the percentage link utilization for the port. A red arrow marks the highest utilization level reached since the *Performance View* was opened. If the system detects activity on a port, it represents minimal activity with at least one bar.

When an end device (node) is logged into a port, moving the cursor over the port's bar graph in the *Performance View* highlights the graph and displays a message with the world-wide name of the connected node. If the connected node has more than one port, this is the world-wide name of the specific port on the node. When a port is functioning as an expansion port (E_Port), the message is "E_Port."

When a port is not logged into an end-device (not functioning as an F_Port) or to another switch (not functioning as an E_Port), the message is the port's current online state. When the port is logged into an end device (functioning as an F_Port), the message is the WWN of the device. A port can also function as an FL_Port.

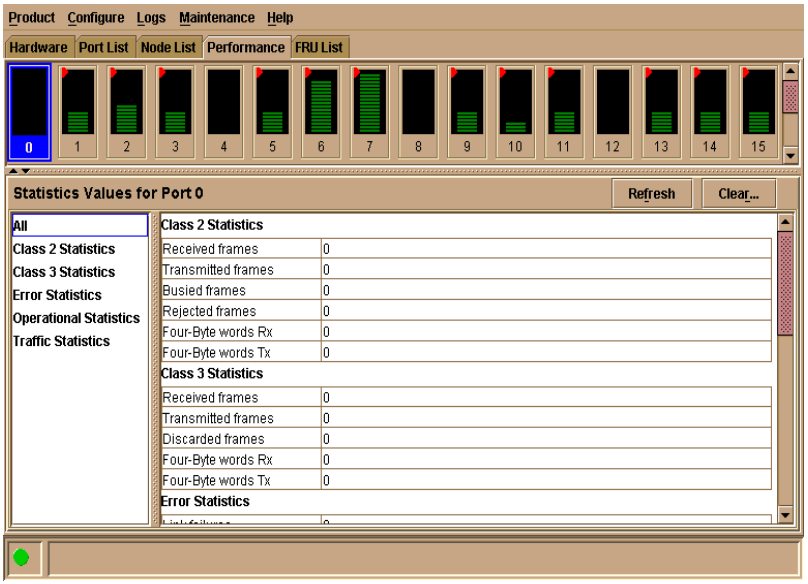


Figure 1-9 Performance View

Right-click a bar graph to display a menu of port-related actions. The options available on this menu are the same as those that are available when you right-click a port in the *Hardware View* or right-click a row in the *Port List View*. These include:

- *Port Properties*
- *Port Technology*
- *Block Port*
- *Enable Beaconing*
- *Port Diagnostics*
- *Clear Link Incident Alert(s)*
- *Reset Port*
- *Port Binding*
- *Clear Threshold Alert(s)*

Note that these same options are also available when you click a port's graph, then select the *Port* secondary menu from the *Product* menu on the menu bar.

For details on menu options, refer to *Port Menu* on page 2-17.

The bottom portion of the *Performance View* displays cumulative statistical information for the port selected in the bar graph. Values are displayed for cumulative port statistics, error count values for a port, including traffic statistics, class 2 and 3 accounting statistics, operational statistics, and error statistics. Click a category in the left frame of the statistics area to display only statistics in that category or click *All* to display values for all categories. Click the *Refresh* button to update the data with current data from the port.

The *Clear* button clears all of the counters to zero. Selecting this button displays a *Clear Port Statistics* dialog box. Select the appropriate radio button and click *OK* to clear all counters to zero on the selected port only or counters on all ports on the switch.

NOTE: Clearing the counters clears the statistics for all users.

For more information about the *Performance View*, including statistics descriptions, refer to *Performance View* on page 2-31.

FRU List View

Select the *FRU List* view tab. A table with information about each of the FRUs installed in the switch displays in the view panel. All data is dynamic and updates automatically. Figure 1-10 shows an example of the *FRU List View.*

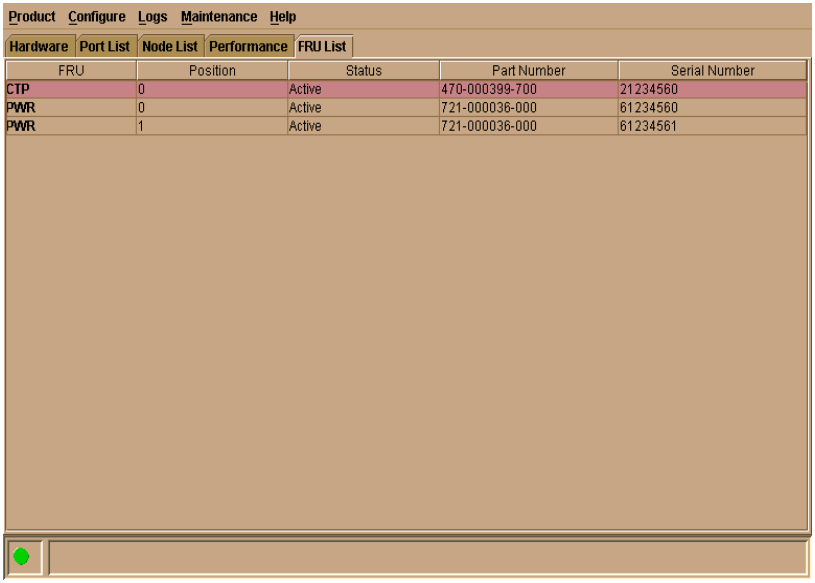

Product Configure Logs Maintenance Help
Hardware Port List Node List Performance FRU List
FRU Position Status Part Number Serial Number
CTP 0 Active 470-000399-700 21234560
PWR 0 Active 721-000036-000 61234560
PWR 1 Active 721-000036-000 61234561

Figure 1-10 FRU List View

For details on navigating and monitoring via the *FRU List View*, refer to *FRU List View* on page 2-24.

Status Bar

The status bar is located along the bottom of the Product Manager window. This includes a symbol that displays at the left side of the bar and messages that display in the panel to the right of the symbol. The symbol indicates the current operating status of the switch and the messages display to provide more description of menu options as you move the cursor over the options under menu bar menus. Refer to Table 1-1 on page 1-33 for the meaning of these status symbols and of the corresponding alert text that displays in the *Sphereon 4500 Fabric Status* table at the top of the *Hardware View* in the view panel.

If a gray square displays in the status bar (no Ethernet connection), a reason for the status displays in the *Status* table at the top of the *Hardware View*. Refer to *No Link Status* on page 2-3 for details

Table 1-1 Operating Status - Status Bar and Switch Status

Symbol	Status Bar	Switch Status Table Text	Meaning
	Green Circle	Fully Operational	All components and installed ports are operational; no failures.
	Yellow Triangle	Redundant Failure	A redundant component has failed, such as a power supply, and the backup component has taken over operation.
		Minor Failure	A failure occurred which has decreased the switch operational ability. Normal switching operations are not affected. • One or more ports failed, but at least one port is still operational. • A fan has failed or is not rotating sufficiently.
	Red Diamond with Yellow Background	NOT OPERATIONAL	A critical failure prevents the switch from performing fundamental switching operations. • All fans failed. • All installed ports failed. • Both power supplies failed.
	Gray Square	Never Connected Link Timeout Protocol Mismatch Duplicate Session Unknown Network Address Incorrect Product Type	Switch status is unknown. This occurs if the Ethernet network connection between the EFC Server and the switch cannot be established or if the CTP fails. Refer to *No Link Status* on page 2-3 for details on the status table text.

Messages display to the right of the status symbol as you move the cursor over options under the menu bar menus. These messages provide additional details about tasks that you can perform through the menu option.

Closing the Product Manager

To close the Product Manager, use the following steps:

1. To close the Product Manager, do one of the following:
   - Select *Close* from the *Product* menu on the menu bar.
   - Click the X button at the top right corner of the Product Manager window.
   - Double-click the icon at the top left corner of the Product Manager window, or right-click the icon and select *Close* from the menu that displays.
2. Select *Logout* or *Exit* from the *Product* menu in the EFC Manager application.
   - If you select *Logout*, the EFC Manager *Login* dialog box displays. You can now log in again using a user name and password. Log into a different EFC Server by selecting a different server from the *EFC Server* box.
   - If you select *Exit*, the *Product View* window closes.

User Rights

The EFC Manager's system administrator can assign levels of access, or "User Rights," to Product Manager users through the EFC Manager application.

NOTE: The EFC Manager's system administrator only has view rights while operating in a specific Product Manager application. Conversely, a Product Manager's product administrator only has view rights while operating in the EFC Manager application.

Detailed instructions concerning the assignment of user rights for both the EFC Manager and Product Manager applications appear in Chapter 3 of the *McDATA Enterprise Fabric Connectivity Manager User Manual* (620-005001).

There are five levels of access or "user rights" that can be assigned to specific users:

- *System Administrator*
- *Product Administrator*
- *Operator*

- *Maintenance*
- *View*

By default, all users have view rights, which allow viewing of but not the changing configurations. View rights cannot be removed.

The user(s) with system administrator rights can make all control and configuration changes implemented through the EFC Manager application.

User Rights for Specific Functions

Table 1-2 itemizes the specific functions available to Product Manager users that have been assigned "user rights" of product administrator, operator, or maintenance. If a user does not have the right to perform a specific operation, a not authorized error box appears when the operation is attempted.

Table 1-2 User Rights for Product Manager Functions

Product Manager Rights	Product Administrator	Operator	Maintenance
Backup/Restore Configuration	X	X	X
Block Port	X	X	X
Change Online State	X		X
Clear Audit Log	X		
Clear Audit Log	X		
Clear Event Log	X		X
Clear Hardware Log	X		X
Clear LIN Alert	X		X
Clear LIN Log	X		
Clear System Error Light			X
Clear Threshold Alerts	X		
Configure Date/Time	X	X	X
Configure Feature Key	X		
Configure Identification	X		
Configure Management Server	X		

Table 1-2 User Rights for Product Manager Functions (*continued*)

Product Manager Rights	Product Administrator	Operator	Maintenance
Configure Switch Parameters	X		
Configure Fabric Parameters	X		
Modify Port Binding	X		
Configure Ports	X	X	
Configure Open Trunking	X		
Configure SNMP	X		
Configure Switch Binding	X		
Configure Threshold Alerts	X		
Configure Zoning	X		
Data Collection			X
Date/Time Sync Configuration	X	X	X
Enable Call Home Notification	X		X
Enable E-Mail Notification	X		X
Enable Web Server	X		
Export Configuration Report	X	X	X
IPL	X		X
Manage Firmware			X
Port Diagnostics			X
Port Beaconing	X	X	X
Reset Configuration			X
Reset Statistics Counters (Performance View)	X	X	
Reset Port	X		
Set Online State	X	X	X
Unit Beaconing	X	X	X
View Event Log	X	X	X

Table 1-2 User Rights for Product Manager Functions (*continued*)

Product Manager Rights	Product Administrator	Operator	Maintenance
View Firmware			X
View Hardware Log	X	X	X
View LIN Log	X	X	X
View Open Trunking Log	X		X
View SNMP	X		X

Backing Up and Restoring Product Manager Data

As long as a Zip® disk remains in the Zip drive of the EFC Server, critical information from both the Product Manager and EFC Manager applications automatically backs up to the Zip disk when the data directory contents change or when you reboot the EFC Server.

NOTE: To ensure trouble-free backups; it is imperative that you leave the Zip drive connected to the EFC Server, and leave a Zip disk in that drive at all times. Removing the disk during a backup or restore can corrupt the database on the disk. Make sure that data is not being written to or read from the Zip drive before you remove the Zip disk. The Iomega QuikSync icon, Figure 1-11 on page 1-39, in the Windows system tray spins when data is writing to or reading from the drive.

The application used for this function is Iomega® QuikSync, a separate application installed on the EFC Server. QuikSync is configured to automatically mirror the contents of the EfcData directory to the Zip drive when the contents are changed or when you reboot the EFC Server. This directory contains all EFC Manager and Product Manager data, so it can be copied back to a newly restored EFC Server to fully recover the preferred operating environment.

NOTE: The QuikSync application and a Zip drive may not be available if you are using a customer-supplied server platform for the EFC Management applications.

The mirroring operation will only occur while a user is logged in to Windows on the EFC Server PC (independent of the EFC Manager login).

The data contained in the EfcData directory and mirrored to the Zip disk includes the following:

- All EFC Manager configuration including:
  - Product definitions
  - User names, encrypted passwords, and user rights
  - Nicknames
  - Session options

  - EFC Manager SNMP configurations
  - E-mail configuration
- All log files (both EFC Manager log files and individual Product Manager log files).
- Zoning library (all zone sets and zone definitions).
- Firmware library.
- Call-home configuration (including phone numbers and dialing options).
- Configuration data saved to the EfcData directory through the *Backup & Restore Configuration* option on the Product Manager's *Maintenance* menu.

The QuikSync application will not backup certain Windows configurations that need to be reconfigured on a newly restored EFC Server, including the following:

- Windows user names and passwords.
- TCP/IP network configuration (such as IP address, gateway address, and DNS names).

The QuikSync application will be included on the EFC Management Applications CD. It automatically installs on the EFC Server during the EFC Server install process. A blank Zip disk is required for each EFC Server and is included with the EFC Server deliverables.

Restoring Data to the EFC Server

To restore data to the EFC Server, copy the: `EfcData directory` from the zip disk to: `C:\` (root directory on the C drive).

Using QuikSync

QuikSync is functioning to back up data when the QuikSync icon displays in the system tray in the right corner of the Windows taskbar (Figure 1-11). This icon spins when data is writing to the Zip disk.

Figure 1-11 QuikSync Icon in Windows System Tray

If an icon does not display, you must enable the application using the procedure outlined in *Enabling QuikSync* on page 1-40.

Enabling QuikSync

1. Click the Windows *Start* button and select *Programs*, then *Iomega QuikSync* and choose *QuikSync*.

   The *Iomega QuikSync* dialog box displays.

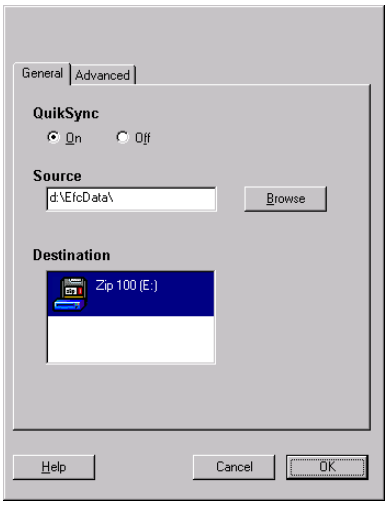


Figure 1-12 Iomega QuikSync Dialog Box

2. Click *On* to enable QuikSync.
3. Click *OK*.

QuikSync Settings

Do not change the default settings for automatic backup of the EfcData directory. If you feel that QuikSync is not functioning properly, check the settings using the following steps:

1. Open the QuikSync dialog box using one of these steps:
   - Click the Windows *Start* button and select *Programs*, then *Iomega QuikSync* and choose *QuikSync*.
   - Double-click the QuikSync icon on the Windows system bar in the lower right corner of the Windows desktop.
   - Right-click on the QuikSync icon and select *Settings* from the menu.
2. Verify that the dialog box is configured exactly as it displays in Figure 1-12.

NOTE: The d:\EfcData\ directory is a mirrored directory of c:\EfcData\. Do not change this location in the *Source* field.

3. Click the *Advanced* tab. The following displays:

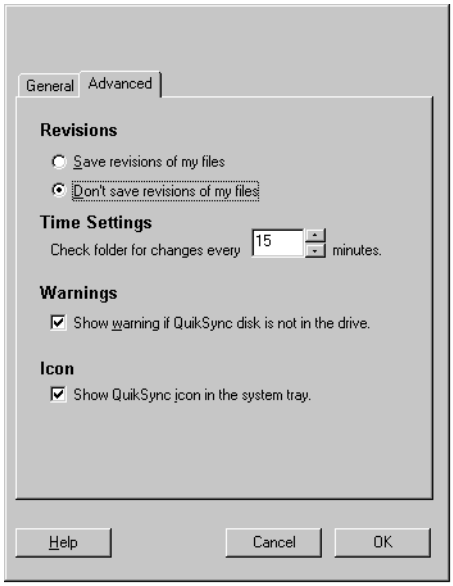


Figure 1-13 Iomega QuikSync Dialog Box (Advanced Tab)

4. Verify that the dialog box is configured exactly as it displays in Figure 1-13.
5. Click *OK*.

2

Monitoring and Managing the Switch

This chapter describes how to use the features available in the Product Manager view panel to monitor and manage switch operation. These features include status indicators, menu options, and dialog boxes available through the *Hardware View*, *Port List View*, *FRU List View*, *Node List View*, and *Performance View*.

Section	Page
Hardware View	2-2
Port List View	2-21
FRU List View	2-24
Node List View	2-26
Performance View	2-31
Port Operational States	2-40
Link Incident Alerts	2-42
Threshold Alerts	2-43

Hardware View

The *Hardware View* is the default view when you open the Product Manager. If another view displays, you can display the *Hardware View* by selecting *Hardware* from view tabs on the Product Manager window. Using this graphical view of the switch, you can view status symbols and simulated light emitting diode (LED) indicators, display data, and use mouse functions to monitor status and obtain vital product information for the switch and its hardware components.

Identifying FRUs

Move the cursor over parts of the switch graphic in the *Hardware View* to display labels identifying each hardware component and its slot position in the chassis relative to identical components installed in the switch. Components include:

- *Power supply module*. Note that each AC connector on the rear of the unit is the location of an internal power supply (two total).
- *Ports* (small form factor LC transceivers).

Monitoring Switch Operation

Monitor the operating status of the switch using the switch *Status* table on the *Hardware View* and the status indicator on the status bar at the bottom of the Product Manager window.

Switch Status Table

The *Status* table at the top of the *Hardware View* displays the switch's operational status, operational state, name, description, and location.

Status

Refer to Table 2-1 on page 2-40 for the meaning of the text that displays in the switch *Status* table and the corresponding status symbols that display on the status bar.

State

The *Status* field displays one of the following:

- **OFFLINE**

  When the switch is "OFFLINE," all ports are offline. The ports cannot accept a login from an attached device or cannot connect to other switches. You can configure this state through the *Set Online State* dialog box. Refer to *Set Online State* on page 5-4 for instructions.

- **Online**

  All unblocked ports are able to connect with devices. You can configure this state through the *Set Online State* dialog box. Refer to *Set Online State* on page 5-4 for instructions. Note that the switch automatically goes online after a power-up, an initial machine load (IML), or initial program load (IPL).

- **Coming online**

  This is a transitional state that occurs just before the switch goes online. This state normally only happens briefly, unless there is a problem reaching the online state.

- **Going offline**

  This is a transitional state that occurs just before the switch goes offline. This state normally only happens briefly, unless there is a problem reaching the offline state.

No Link Status

If the Ethernet network connection between the EFC Server and the switch is down, the *Hardware View* displays the front and rear of the unit without FRUs. The switch *Status* table at the top of the *Hardware View* changes to display the status (No Link) and reason with a yellow background. The name, description, and location fields are blank.

The *Reason* field on the switch *Status* table displays one of the following reasons when there are no links.

- **Never Connected**

  A network connection was never established between the switch and the EFC Server or the CTP card has failed. Check the IP addresses, the Ethernet local area network (LAN) physical connection between the switch and EFC Server, and other network connection conditions.

- **Link Timeout**

  The network connection that was established between the switch and EFC Server has been lost. Check the IP addresses, the Ethernet LAN physical connection between the switch and EFC Server, IP addresses, and other network components.

- **Protocol Mismatch**

  The switch and the EFC Server are not at compatible software release levels. Update the EFC Manager software version.

- **Duplicate Session**

  A link has previously been established between the switch and another instance of the EFC Server. Connect to the previously established EFC Server from the EFC Manager login screen.

- **Unknown Network Address**

  The address defined for the switch in the EFC Manager could not be found in the domain name server (DNS). Either the name was mistyped when the switch was added to the EFC Manager, or the name was not available from the DNS. Check the network IP address for the switch definition in the EFC Manager by right-clicking the product icon and selecting *Properties*. The IP address displays in the *Network Address* field.

- **Incorrect Product Type**

  The product at the configured network address is not a switch. Verify address, configuration, and product type.

Status Bar Status Indicator

The status bar displays a colored status symbol that indicates the overall operating status of the switch unit. The operating status depends on hardware component failures, which are indicated by status symbols that display over component graphics in the *Hardware View*. Refer to *Hardware View* on page 2-2 for the meanings of status symbols in the status bar.

The status bar indicates the switch operating status based on component failures. For example, for a single port failure, a blinking red and yellow diamond displays on the port connector in the *Hardware View*. At the same time, a yellow triangle displays in the status bar to indicate a degraded switch. However, if a blinking red and yellow diamond displays over both power supplies, the status bar displays a red and yellow diamond, indicating a failure that requires immediate attention.

Monitoring Hardware Operation

Determine hardware component operating status and states by the simulated light emitting diode (LED) indicators and status symbols, such as flashing red and yellow diamonds and yellow triangles, that appear on hardware components. These simulated LEDs and status symbols reflect the state of the actual hardware as changes occur. Corresponding or additional descriptions of hardware status and states also display when you double-click components to display *Properties* dialog boxes.

Figure 2-1 illustrates the *Hardware View* for the Sphereon 4500 Fabric Switch. The figure includes examples of symbols and LED indicators that display to help you monitor hardware operation. Numbers by the example are keyed to descriptions under *Front View* and *Rear View* on page 2-7.

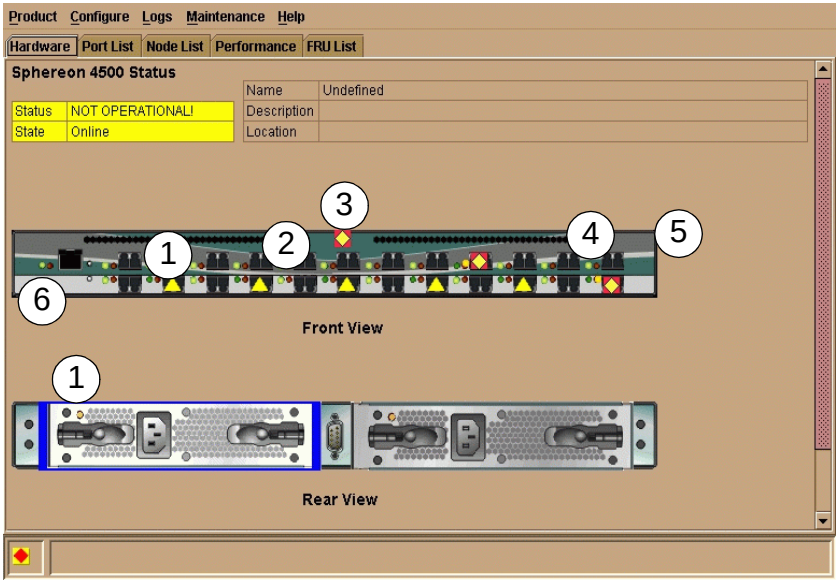


Figure 2-1 Hardware Operation - Sphereon 4500 Fabric Hardware View

Front View

1. *Port Attention Indicator*: The yellow triangle ( ) indicates that a link incident occurred or that the port is not operational, in nonstandard mode of operation, or has other status. You can determine the reason for a link incident by displaying the *Port Properties* dialog box for the port. For details on status symbols, refer to Table 2-1 on page 2-40.

For information on link incidents, refer to *Link Incident Alerts* on page 2-42.

2. *Port LED Indicator:* The green or blue indicator and amber indicator to the left of each port connector simulates LED operation on the actual switch port. A green LED indicates that the port is online with an operating speed of 1 gigabits per second (Gbps). A blue LED indicates that the port is online with an operating speed of 2 Gbps. When the amber indicator illuminates steady, the port has failed and requires service. For details on port LED indicator operation, see Table 2-1 on page 2-40.

3. *Port Failure Indicator*: A blinking red and yellow diamond ( ) below a port connector indicates that the port has failed. Refer to Table 2-1 on page 2-40 for details on port operating states and the status symbol and indicator operation.

4. *Beaconing*: When a blinking amber LED indicator displays by a port and an attention indicator ( ) displays below the port's connector, beaconing is enabled. Refer to Table 2-1 on page 2-40 for details on port operating states and the status symbol and indicator operation.

5. Not Installed. The port optics are not installed, or the feature that provides additional port function is not enabled.

6. *Power, System Error, and Unit Beaconing Indicators*: The green or blue indicator and amber indicators on the far left of the front view simulates the power and system error LEDs on the actual switch.

- *Power Indicator*. The green/blue indicator (**PWR**) simulates the power LED on the actual switch. When the indicator illuminates, the switch is connected to facility AC power and is operational. The indicator will be on if either power supply is operating.
- *System Error Indicator*. The amber system error light indicator (**ERR**) simulates the system error light on the actual switch. When this indicator illuminates, an event has occurred requiring immediate attention, such as a system, power supply/fan, or port failure. View details of system errors by selecting *Event Log* from the *Logs* menu on the Product Manager menu bar. The indicator in the *Hardware View* and the LED on the actual unit remains illuminated until you clear the event by right-clicking on the front or rear view away from a hardware component and selecting *Clear System Error Light* from the menu.

- *Unit Beaconing Indicator*. The amber system error indicator blinks if unit beaconing is enabled. Enable and disable unit beaconing by right-clicking on the front or rear view away from a hardware component and selecting *Enable Unit Beaconing* from the menu. You can only enable beaconing if there are no system errors (the system error indicator is off).

Rear View

1. *Power Supply Status*: Each AC power connector indicates the location of an internal power supply. An amber, service-required LED indicator is located in the upper left corner of each AC power connector. The indicator illuminates if the power supply has failed and requires service. The indicator is off if the power supply is active.

When a red and yellow diamond ( ) displays on a power connector, like in Figure 2-1 on page 2-5, the internal power supply for that connector failed. Note that the switch operates with one power supply failure, however replace the power supply as soon as possible to retain redundancy.

Obtaining Hardware Information

This section explains how to access the *FRU Properties*, *Port Properties*, and *Switch Properties* dialog boxes.

Displaying FRU Information

Display the *FRU Properties* dialog box using one of the following methods:

- Double-click on a FRU, such as a power supply module illustrated in the *Hardware View*.
- Select a FRU in the *Hardware View*, then select *FRU* and *FRU Properties* from the *Product* menu.
- Double-click on a row in the *FRU List* view.

The *FRU Properties* dialog box displays the FRU name; slot position relative to identical FRUs installed in the chassis, active or failed state, part number, and serial number.

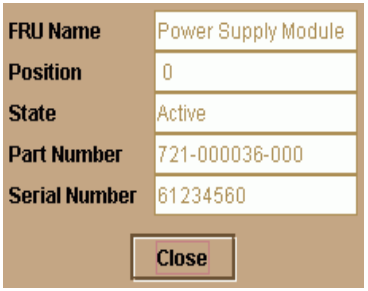


Figure 2-2 FRU Properties Dialog Box

Displaying Port Information

There are several ways to display the *Port Properties* dialog box:

- Double-click on a port connector in the *Hardware View.*
- Right-click on a port connector in the *Hardware View* and select *Properties* from the pop-up menu.
- Double-click on the port row in the *Port List View* table.
- Right-click on a port connector in the *Performance View* and select *Properties* from the pop-up menu.
- Click on a connector, port row, or bar graph in the preceding views or select the *Port* menu under the *Product* menu on the menu bar across the top of the *Product Manager* window.

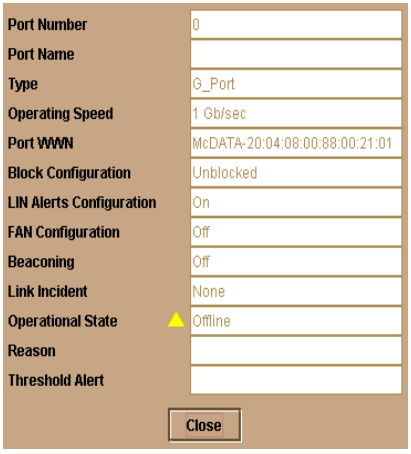


Figure 2-3 Port Properties Dialog Box

- **Port Number**

  The physical port number.

- **Port Name**

  User-defined port name or description. Refer to *Configure Ports* on page 3-10 for instructions.

- **Type**

  — G_port. This displays if nothing is logged into the port.

  — F_Port. This displays if a device is logged into the port.

  — E_Port. This displays if the port is connected to another switch's E_Port via an ISL.

  — FL_Port. This displays if a private loop device is logged into the port.

- **Operating Speed**

  Displays the current data speed for the port as 1 Gb/sec, 2 Gb/sec, or Not Established. *Not Established* displays if *Negotiate* was set for the port through the *Configure Ports* dialog box and the data speed has not been resolved between the port and the attached device, or if the port and device are not communicating.

- **Port WWN**

  The port's 16-digit world-wide name (WWN).

- **Block Configuration**

  Blocked or unblocked. Operation can be blocked or unblocked through the *Configure Ports* dialog box. Refer to *Configure Ports* on page 3-10 for instructions.

- **LIN Alerts Configuration**

  This field indicates whether LIN alerts are enabled or disabled. LIN alerts can be configured through the *Configure Ports* dialog box. The default is for the LIN alerts to be enabled.

- **FAN Configuration**

  Indicates whether Fabric Address Notification (FAN) is On or Off when the port is operating as an FL_Port.

- **Beaconing**

  This field indicates the beaconing status for the port. To enable or disable beaconing, right-click the port and select *Enable Beaconing*. (A port in a failed state cannot be set to beacon.)

- **Link Incident**

  Description of the last link incident that occurred on the port.

- **Operational State**

  Beaconing, inactive, invalid attachment, link incident, link reset, no light, not operational, online, offline, port failure, segmented E_Port, testing, or not installed. Refer to Table 2-1 on page 2-40 for definitions of operational states.

- **Reason**

  When the port operating state is "Segmented E_Port," "Invalid Attachment," or "Inactive," this field displays the reason for that state. When an E_Port is segmented, two fabrics are prevented from joining. This only occurs when the switch is connected to another switch.

  The following messages display in the *Reason* field of the *Port Properties* dialog box if an Invalid Attachment, Segmented E_Port, or Inactive state occurs for the port.

  Invalid Attachment Messages:

  — *01 Unknown.* Invalid attachment reason cannot be determined.

  — *02 ISL connection not allowed on this port.* Port is configured as an F_Port, but connected to switch or switch.

  — *03 ELP rejected by the attached switch.* This switch transmitted an exchange link protocol (ELP) frame that was rejected by the switch at the other end of the ISL.

  — *04 Incompatible switch at the other end of the ISL.* Interop mode for this switch is set to Open Fabric mode and the switch at the other end of the ISL is a McDATA switch configured for McDATA Fabric mode.

  — *05 External loopback adapter connected to the port.* A loopback plug. is connected to the port.

  — *06 N_Port connection not allowed on this port.* The port type configuration does not match the actual port use. Port is configured as an E_Port, but attaches to a node device.

— *07 Non-McDATA switch at other end of the ISL*. The cable is connected to a non-McDATA switch and interop mode is set to McDATA fabric mode.

— *08 ISL connection not allowed on this port*. The port type configuration does not match the actual port use (the port is configured as an F_Port, but attaches to a switch or director).

— *10 Port binding violation - unauthorized WWN*. The WWN entered to configure port binding is not valid or a nickname was used that is not configured through the Product Manager for the attached device.

— *11 Unresponsive node connected to port.* Possible causes are:

- Hardware problem on switch or on a connected node where ELP frames are not delivered, the response is not received, or a fabric login in (FLOGI) cannot be received. There may be problems in switch SBAR.
- Faulty or dirty cable connection.
- Faulty host bus adapters that do not send out FLOGI within reasonable time frame.

Segmented E_Port Messages:

— Incompatible operating parameters, such as resource allocation time-out values (R_A_TOV) or error-detect time-out values (E_D_TOV) are inconsistent. Refer to *Configure Switch Parameters* on page 3-3 for more information.

— Duplicate domain IDs. Refer to *Configure Switch Parameters* on page 3-3 for more information.

— Incompatible zoning configurations. Refer to sections on joining zoned fabrics in the *Sphereon 4500 Fabric Switch Installation and Service Manual* (620-000159) and the *Enterprise Fabric Connectivity User Manual* (620-005001) for details.

— Build fabric protocol error.

— No principal switch (no switch in fabric is capable of being principal switch).

— No response from an attached switch.

- **Threshold Alert**

  If a threshold alert exists for the port, an alert indicator (yellow triangle) will appear by the *Threshold Alert* field, and the configured name for the last alert received will appear in the field.

Displaying Switch Information

Double-click the switch illustration, away from a hardware component, to display the *Switch Properties* dialog box as shown in the following figure.

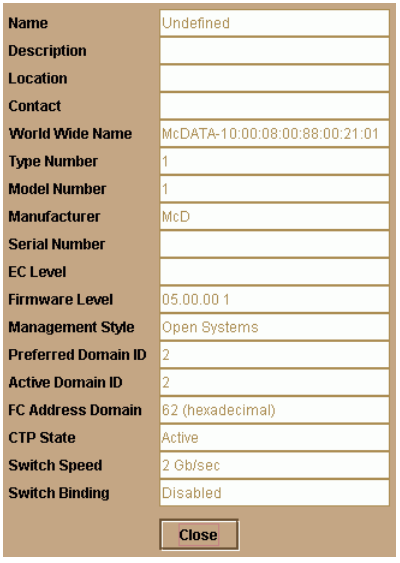


Figure 2-4 Switch Properties Dialog Box

The following displays in this dialog box:

- Switch *Name*, *Description*, *Location*, and *Contact* configured through the *Configure Identification* dialog box.
- Fibre Channel *World Wide Name* (WWN) identifier for the switch.
- Product *Type Number*.
- Product *Model Number*.
- Product *Manufacturer*.
- Product *Serial Number*.
- Engineering change level (*EC Level*).

- *Firmware Level*.
- *Management Style.* Always set to the *Open Systems* management style.
- *Preferred Domain ID* as set through the *Configure Operating Parameters* dialog box.
- *Active Domain ID*. The actual domain ID assigned to the switch.
- *FC Address Domain*. The switch's Fibre Channel address (hexadecimal).
- *CTP State*. Either active or failed.
- *Switch Speed*. This is always set to 2 Gb/sec.
- *Switch Binding*. Enabled if the optional SANtegrity Binding features are installed and enabled. Otherwise, disabled displays.

Using Menu Options

Right-click on various parts of the *Hardware View* to display menu options for displaying status and information and for controlling the switch and various hardware components.

Switch Menu

Right-click on any area of the switch illustration where a hardware component is not installed to display the following menu options.

Switch Properties

Click to display the *Switch Properties* dialog box. This dialog box contains the switch name, description, location, and contact person configured through the *Configure Identification* dialog box. Also included is other product information as detailed in *Displaying Switch Information* on page 2-12. You can also display this dialog box by double-clicking an area on the illustration away from a hardware component.

Enable Unit Beaconing

Click the check box to toggle unit beaconing on or off. When the check box has a check mark, unit beaconing is on, and the system error light (**ERR**) on the switch blinks to help users locate the unit managed by the Product Manager. The amber indicator on the *Hardware View* also blinks when beaconing is enabled. When you click the check box to remove the check mark, the unit beaconing is disabled.

NOTE: You can only enable beaconing if there are no system errors (the system error indicator is off).

Clear System Error Light

Select this to turn off the amber system error light (**ERR**), located below the green/blue power (**PWR**) LED on the switch. This also turns off the amber system error light indicator in the *Hardware View* (front view)

IPL Switch

Select this option to initiate an IPL on the switch. When the dialog box displays confirming the IPL, click *Yes*.

NOTE: An IPL is not intended for ordinary or casual use and should only be performed when directed by your support personnel.

Refer to *Execute an IPL* on page 5-2 for detailed procedures.

Set Switch Date and Time

Select this option to display the *Configure Date and Time* dialog box.

1. Click to display the *Configure Date and Time* dialog box.

   The dialog box displays with a check mark (the default) in the *Periodic Date/Time Synchronization* check box. If this field is checked, the EFC Server periodically sets the switch time to automatically synchronize with the EFC Server time. Daylight savings time automatically updates on the switch using this option.

   The current date and time display in the *Date* and *Time* fields. If the *Periodic Date/Time Synchronization* field is checked, the *Date* and *Time* fields are disabled (grayed out).

   To enable and disable *Periodic Date/Time Synchronization*, click the check box and then click *Activate*.

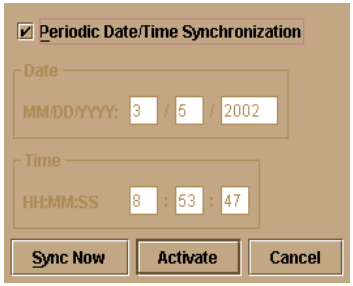


Figure 2-5 Configure Date and Time Periodic Synchronization Dialog Box

2. Perform one of the following steps:

- To immediately synchronize the switch date and time with the EFC Server, be sure the *Periodic Date/Time Synchronization* option is enabled and then click *Sync Now*.

NOTE: If you enable the *Periodic Date/Time Synchronization* feature and click *Activate*, the time will synchronize at the next update period.

To set the switch with a specific date and time, make sure that the *Periodic Date/Time Synchronization* field is not selected. Refer to Figure 2-6. Enter the date and time and then click *Activate*.

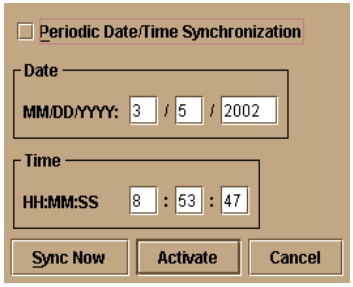


Figure 2-6 Configure Date and Time Manually

NOTE: Use the range of 0 to 23 for hours. Use the range of 0 to 59 for minutes and seconds.

Set Switch Online State

Click to display the *Set Online State* dialog box. The dialog box displays the current state (offline or online) and provides a button for changing the state.

CAUTION

Before setting the switch offline, warn administrators and users currently operating attached devices that the switch is going offline and that there will be a disruption of port operation. Also, request that the devices affected by an interruption of data flow be set offline.

1. Click the *Set Offline* or *Set Online* button to toggle between the states.

Figure 2-7 Set Online State Dialog Box (Switch is Offline)

Figure 2-8 Set Online State Dialog Box (Switch is Online)

2. When the *Set Online* or *Set Offline* warning dialog box displays, click *OK* to set the switch online or offline.

   As the switch goes offline, the word, "OFFLINE," displays in the *State* field in the left corner of the *Hardware View.* As the switch goes online, the word, "ONLINE," displays in the *State* field in the left corner of the *Hardware View.* When going offline, LED indicators on all ports with attached devices stay green/blue, but the switch sends offline sequences (OLS) to these devices.

Port Menu

While in the *Hardware View*, right-click on any port to display the following menu options.

Port Properties

Click this to display the *Port Properties* dialog box. This dialog box displays technical information about the port. See *Displaying Port Information* on page 2-8 for more information.

Port Technology

Click this to display the *Port Technology* dialog box. This dialog box displays the following information:

- Port number.
- Connector type: Always LC.
- Transceiver type: Longwave laser LC or shortwave laser LC.
- Distance: General distance range for port transmission. This can be either short to long distances for the longwave laser LC transceiver or short distances for the shortwave laser LC transceivers.
- Media: The Fibre Channel mode and optic size. For the longwave laser LC transceiver, this would be singlemode 9-micron. For the shortwave laser LC transceiver, this would be multimode 50-micron or 62.5-micron.
- Speed: This will be either 1Gbit per second or 1 Gbit, 2 Gbit per second.

Block Port

Click to display a check mark and block port transmission If blocked, a node attached to the port is prevented from logging into the switch or communicating with other devices attached to switch ports. A blocked port continuously transmits offline signals (OLS). Click to remove the check mark and unblock the port. If unblocked, a node attached to the port can communicate with the switch and communicate with other nodes attached to the switch.

Enable Beaconing

Click this to make the amber LED by the port blink on the actual switch and the amber indicator blink for the port in the *Hardware View*. This enables users to locate the unit where the port is located. When a blinking amber LED indicator displays by a port, an attention indicator ( ) displays below the port's connector in the *Hardware View* and on the port's row in the *Port List View*.

Port Diagnostics

Click this option to display the *Port Diagnostics* dialog box. Use this dialog box to run an internal loopback and external loopback test on the port. The *Port Diagnostics* option enables you to run internal and external loopback tests on any port. To use this option, follow the detailed steps in the *McDATA Sphereon 4500 Fabric Switch Installation and Service Manual* (620-000159).

Clear Link Incident Alert(s)

Click this to clear the attention indicator on the *Hardware View*, the *Port List View*, and the *Performance View*. In addition, the procedure clears the alert description in *Port Properties* dialog boxes. If there are no link incident alerts set for a port, no actions occur. Although you can manually clear link incidents, they may also be cleared by actions outside of the user interface, such as when rebooting the EFC Server.

Reset Port

Click to display a confirmation dialog box. Click *Yes* on that dialog box to reset the port. If a switch is attached to the port and online, this operation sends a link reset to the attached switch, otherwise this action disables port beaconing for the port. If the port is in a failed state, such as after failing a loopback test, the reset restores the port to an operational state, clearing the service required (amber) LED. The reset does not affect other ports in the switch.

Port Binding

Click to display the *Port Binding* dialog box (Figure 2-9). Use this dialog box to allow a device with a specific WWN or nickname to have exclusive connection to a port. To use this dialog box, refer to the following paragraphs.

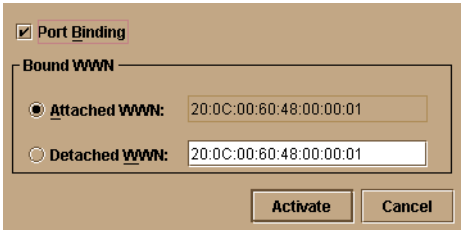


Figure 2-9 Port Binding Dialog Box

Port Binding dialog box parameters:

- **Port Binding**: Click this check box to place check mark in the box and enable WWN binding for the port. When enabled, only a specific device can communicate through the port. This device is specified by the WWN or nickname entered into the *Bound WWN* field (either the *Attached WWN* or *WWN* options). With the check box cleared, any device can communicate through the port even if a WWN or nickname is specified in the *Bound WWN* field.
- **Attached WWN**: Click the radio button and, if a device is logged into the port, the device's WWN will display in the field. The device with this WWN or nickname will have exclusive communication privileges to the port if *WWN Binding* is enabled.

  NOTE: If you click this radio button to bind the port to a logged-in device and there are no devices logged in, the port is essentially bound to a WWN of "0." This prevents any device from logging in until this button is re-enabled to bind the WWN of a logged-in device or until you explicitly bind the WWN of a device by clicking the WWN radio button and entering a WWN or nickname (see the following). Changes only take effect when you click the *Activate* button.

- **WWN**: Click the radio button and enter a world wide name (WWN) in the proper format (xx.xx.xx.xx.xx.xx.xx.xx) or a nickname configured through the Product or EFC Manager applications. The device with this WWN or nickname will have exclusive communication privileges through the port if *WWN Binding* is enabled.

  Note the following:

  — If you do not enter valid WWN or nickname in this field, but the *Port Binding* check box is checked (enabled), then no devices can communicate over the port.

  — If you enter a WWN or nickname in this field and do not place a check in the *Port Binding* check box, the WWN or nickname will be stored, and all devices can communicate over the port.

- **Activate**: Click this button to activate settings in this dialog box.

Warning and error message display:

- If one or more of the nodes logged into a port does not match the WWN or nickname configured in the field by the *WWN* radio button, a warning dialog box displays after you activate the configuration. This warning box displays a list of all nodes that will be logged off if you continue. If you click *Continue* on the

warning box, these nodes will be logged off and the port will only attach to the device with the device with the WWN or nickname configured in the *WWN* field.

- An error message displays after you activate the configuration if the format for the WWN entered in the *WWN* field is not valid (not in xx.xx.xx.xx.xx.xx.xx.xx format) or if you have entered a nickname that was not configured through the Product Manager.

Clear Threshold Alert(s)

Click this to display the *Clear Threshold Alert(s)* dialog box. Select the appropriate option to clear alerts for the selected port only or all ports on the switch. This clears all attention indicators that notify users of threshold alerts in dialog boxes and views. This action also restarts the notification interval and the cumulative minutes for utilization % interval.

Figure 2-10 Clear Threshold Alert(s) Dialog Box

Port List View

Display the *Port List View* (Figure 2-11) in the view panel by selecting the *Port List* option from view tabs on the Product Manager window.

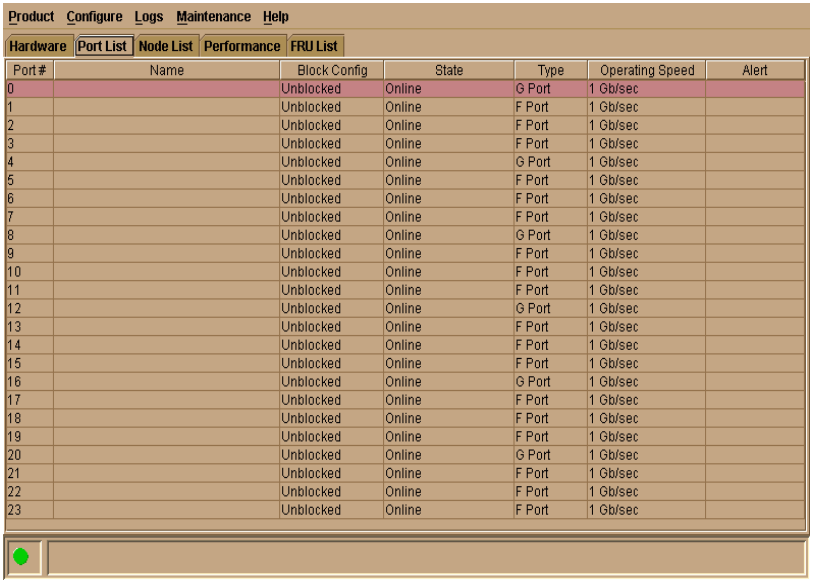

Product Configure Logs Maintenance Help
Hardware Port List Node List Performance FRU List
Port # Name Block Config State Type Operating Speed Alert
0 Unblocked Online G Port 1 Gb/sec
1 Unblocked Online F Port 1 Gb/sec
2 Unblocked Online F Port 1 Gb/sec
3 Unblocked Online F Port 1 Gb/sec
4 Unblocked Online G Port 1 Gb/sec
5 Unblocked Online F Port 1 Gb/sec
6 Unblocked Online F Port 1 Gb/sec
7 Unblocked Online F Port 1 Gb/sec
8 Unblocked Online G Port 1 Gb/sec
9 Unblocked Online F Port 1 Gb/sec
10 Unblocked Online F Port 1 Gb/sec
11 Unblocked Online F Port 1 Gb/sec
12 Unblocked Online G Port 1 Gb/sec
13 Unblocked Online F Port 1 Gb/sec
14 Unblocked Online F Port 1 Gb/sec
15 Unblocked Online F Port 1 Gb/sec
16 Unblocked Online G Port 1 Gb/sec
17 Unblocked Online F Port 1 Gb/sec
18 Unblocked Online F Port 1 Gb/sec
19 Unblocked Online F Port 1 Gb/sec
20 Unblocked Online G Port 1 Gb/sec
21 Unblocked Online F Port 1 Gb/sec
22 Unblocked Online F Port 1 Gb/sec
23 Unblocked Online F Port 1 Gb/sec

Figure 2-11 Port List View

The *Port List View* displays the following information on all ports that can be installed in the switch. This display is updated automatically.

- **#**

  Number of the port from 0 through 23.

- **Name**

  Displays the port name as configured through the *Configure Ports* dialog box.

- **Block Config**

  Indicates the blocked or unblocked configuration of the port as set through the *Configure Ports* dialog box.

The *Block Port* option available through port right-click menus in the *Hardware View*, port row right-click menus in the *Port List* view, is also the port bar graph right-click menus in the *Performance View*, and the *Port* secondary menu of the *Product* menu on the menu bar.

Blocked states are:

— **Blocked**: Devices communicating with the port are prevented from logging into the switch or communicating with other devices attached to switch ports. A blocked port continuously transmits OLS.

— **Unblocked**: Devices communicating with the port can log in to the switch and communicate with devices attached to any other unblocked port in the same zone.

- **State**

  The following port operational states may display in this table. For more information on these states and corresponding status symbol and LED indicator operations in the *Hardware View*, see *Port Operational States* on page 2-40.

  — No Light

  — Online

  — Offline

  — Beaconing

  — Link Reset

  — Not Operational

  — Not Installed

  — Invalid Attachment

  — Port Failure

  — Segmented E_Port

  — Link Incident

  — Testing

  — Inactive

- **Type**

  The type of port. If the *Port State* is online, the available port types are *F_Port*, *FL_Port*, and *E_Port*. If the *Port State* is not online, the available port types are the configured type: *Gx_Port*, *G_Port*, *Fx_Port*, *F_Port*, and *E_Port*.

- **Operating Speed**

  This column indicates the speed at which the port is operating. Possible values are 1 Gb/sec and 2 Gb/sec.

- **Alert**

  This column displays a yellow triangle if a link incident occurs on the port or if the port's LED is beaconing. Blinking red and yellow diamonds display for port failures or for ports requiring service. Click on the row to display the reason for the alert in the *Port Properties* dialog box.

Click a row to select it, highlight it, and display the *Port Properties* dialog box. For an explanation of the fields on the *Port Properties* dialog box, refer to *Displaying Port Information* on page 2-8.

Menu Options

Right-click a row to select it, highlight it, and display a menu with the following port-related action options. These are the same menu options that display when you right-click a port in the *Hardware View* and *Performance View*. You can also display this menu by clicking on a port, port row, or port graph in the preceding views and selecting the *Port* secondary menu from the *Product* menu on the menu bar.

Refer to *Port Menu* on page 2-17 for an explanation of these menu options.

- *Port Properties*
- *Port Technology*
- *Block Port*
- *Enable Beaconing*
- *Port Diagnostics*
- *Clear Link Incident Alert*
- *Reset Port*
- *Port Binding*
- *Clear Threshold Alert(s)*

NOTE: For *Node Properties*, if a node is not logged in a message displays indicating that node information is not available.

FRU List View

Display the *FRU List* in the main panel by selecting the *FRU List* view tab on the Product Manager window. This view displays information about all installed FRUs on the switch. All data is dynamic and updates automatically as the software detects changes.

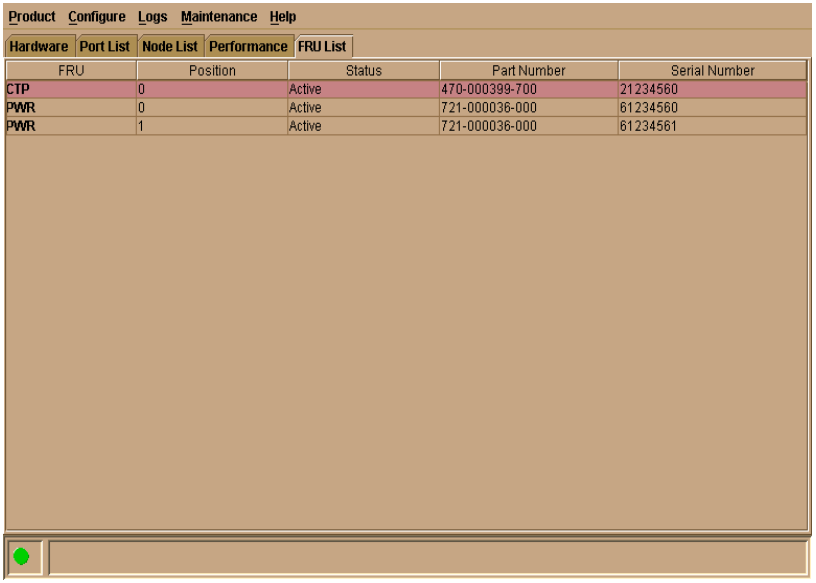

Product Configure Logs Maintenance Help
Hardware Port List Node List Performance FRU List
FRU Position Status Part Number Serial Number
CTP 0 Active 470-000399-700 21234560
PWR 0 Active 721-000036-000 61234560
PWR 1 Active 721-000036-000 61234561

Figure 2-12 FRU List View

Information on the *FRU List View* for each FRU includes:

- FRU Name: CTP (Control Processor), and PWR (power-supply module). Note that the CTP is an internal component, and if it fails completely the entire switch must be replaced.

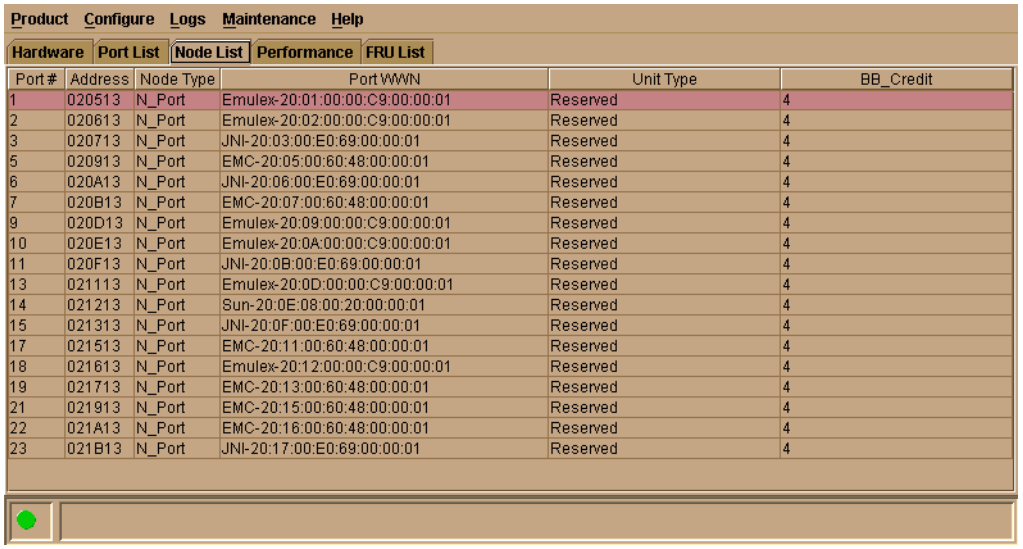
- Position: Slot position of FRU in the chassis relative to identical FRUs also installed in the chassis. These consist of one CTP card (position 0) and two power supply modules/fan (positions 0-1):
  - *PWR* - Power supply module/fan
  - *CTP* - Control processor
- Status: Active or failed. *Active* displays always unless the FRU fails. *Failed* displays if the FRU is not functional.
- Part Number: Part number of the FRU.
- Serial Number: Serial number of the FRU.

Click to select a row in the *FRU List View* and select *Properties* from the *FRU* submenu of the *Product* menu to display the *Properties* dialog box for the FRU.

Click *CTP* to display the *Switch Properties* dialog box.

Node List View

Display the *Node List View* in the view panel by selecting *Node List* from the view tabs on the Product Manager window. This view displays information about all node attachments to any F_Ports on the switch sorted by port number. All data is dynamic and updates automatically as devices log in and log out.



Port #	Address	Node Type	Port WWN	Unit Type	BB_Credit
1	020513	N_Port	Emulex-20:01:00:00:C9:00:00:01	Reserved	4
2	020613	N_Port	Emulex-20:02:00:00:C9:00:00:01	Reserved	4
3	020713	N_Port	JNI-20:03:00:E0:69:00:00:01	Reserved	4
5	020913	N_Port	EMC-20:05:00:60:48:00:00:01	Reserved	4
6	020A13	N_Port	JNI-20:06:00:E0:69:00:00:01	Reserved	4
7	020B13	N_Port	EMC-20:07:00:60:48:00:00:01	Reserved	4
9	020D13	N_Port	Emulex-20:09:00:00:C9:00:00:01	Reserved	4
10	020E13	N_Port	Emulex-20:0A:00:00:C9:00:00:01	Reserved	4
11	020F13	N_Port	JNI-20:0B:00:E0:69:00:00:01	Reserved	4
13	021113	N_Port	Emulex-20:0D:00:00:C9:00:00:01	Reserved	4
14	021213	N_Port	Sun-20:0E:08:00:20:00:00:01	Reserved	4
15	021313	N_Port	JNI-20:0F:00:E0:69:00:00:01	Reserved	4
17	021513	N_Port	EMC-20:11:00:60:48:00:00:01	Reserved	4
18	021613	N_Port	Emulex-20:12:00:00:C9:00:00:01	Reserved	4
19	021713	N_Port	EMC-20:13:00:60:48:00:00:01	Reserved	4
21	021913	N_Port	EMC-20:15:00:60:48:00:00:01	Reserved	4
22	021A13	N_Port	EMC-20:16:00:60:48:00:00:01	Reserved	4
23	021B13	N_Port	JNI-20:17:00:E0:69:00:00:01	Reserved	4

Figure 2-13 Node List View

Information that displays for each node includes:

- **Port #**

  Number of the port, from 0 through 23.

- **Fibre Channel Address**

  The 3-byte Fibre Channel address for the node or the arbitrated loop physical address (ALPA) for private loop devices.

- **Node Type**

  — N_Port: The switch port is operating as an F_Port.

  — NL_Port: the switch port is operating as an FL_Port

- **Port WWN**

  The port WWN of the attached node (N_Port). The 16-digit WWN is a set of unique numbers assigned to the device attached to the port. The WWN is prefixed by the manufacturer's name of the host bus adapter that attaches to the device. If there is a nickname assigned, the nickname displays instead of the WWN. For private loop devices, "Not Logged In" displays.

- **Unit Type**

  The following information, if supported, is supplied by the attached device:

  — Converter

  — Gateway

  — HBA

  — Module

  — Other

  — Proxy-agent

  — Storage device

  — Software driver

  — Storage subsystem

  — Switch

  — Unknown

NOTE: The Unit Type comes directly from the device's sense ID when the device attaches to the port during login. If the connection is lost to the device, the type will display as "Unspecified," since the device is no longer logged into the port. When the device logs back in, the unit type updates.

- **BB_Credit**

  The BB_Credit supported by the device. For private loop devices, this field will be blank.

Double-click a row to display the *Node Properties* dialog box. For an explanation of the fields on the *Node Properties* dialog box, refer to *Displaying Node Properties*.

NOTE: Private loop devices do not log into the fabric and do not provide any additional information other than their Arbitrated Loop Physical Address (ALPA) for private loop devices. The Port WWN field displays Not Logged In and the Unit Type field is blank for all private loop devices.

Menu Options

Double-click on a port row to highlight it and display the Node Properties dialog box for that port.

Right-click a row to select it, highlight it, and display a menu with the following port-related action options:

- **Node Properties**

  Select this option to display the *Node Properties* dialog box. Refer to *Displaying Node Properties* on page 2-29 for details.

- **Port Properties**

  Select this option to display the *Port Properties* dialog box (refer to Figure 2-3 on page 2-8).

- **Define Nickname**

  Select this option to display the *Define Nickname* dialog box, where you can define a nickname to display for the attached device instead of the device's 8-byte WWN.

  The *Define Nickname* dialog box displays the world wide name (WWN) of the device attached to the port. To define a nickname, enter a name of up to 32 characters in the *Nickname* field and click *OK*. The nickname will display under the *Port WWN* column instead of the device's WWN.

- **Display Options**

  Select *Nickname* or *Worldwide Name* from the submenu. Selecting *Nickname* displays attached devices in the *Port WWN* column by the nickname configured through the *Define Nickname* menu option. Selecting *Worldwide Name* displays attached devices in the *Port WWN* column by the device's WWN.

  Note that you can also display these menu options by clicking a port row, and selecting the *Port* secondary menu from the *Product* menu on the Product Manager menu bar.

Displaying Node Properties

Open the *Node Properties* dialog box by double-clicking a row in the *Node List View* or right-clicking a row and selecting *Node Properties* from the menu. You can also display this dialog box by right-clicking on a port in the *Hardware View*, right-clicking on a port's row in the *Port List View*, or right-clicking on a port's bar graph in the *Performance View* and selecting *Node List* from the menu. In addition, you can display this dialog box by clicking to select a port, port row, or port bar graph in the preceding views and selecting *Node Properties* from the *Port* secondary menu on the *Product* menu of the Product Manager menu bar.

NOTE: If a node is not logged in, a message appears indicating that node information is not available.

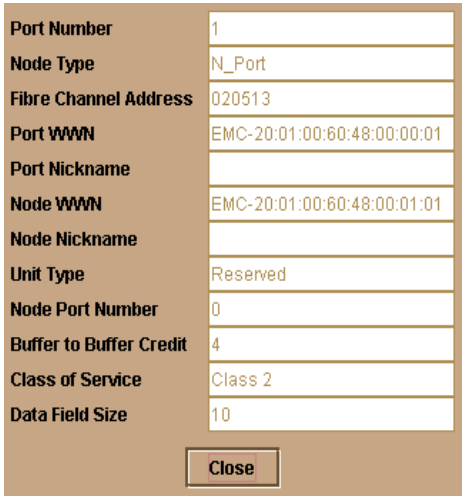


Figure 2-14 Node Properties Dialog Box

- **Port Number**

  The physical port number on the switch to which the node is connected.

- **Node Type**

  The type of port, as supplied by the attached port.

- **Fibre Channel Address**

The 3-byte address of the node or the ALPA for private loop devices.

- **Port WWN**

  Port world-wide name of the attached device.

- **Port Nickname**

  Nickname for the port WWN. Must be configured to display.

- **Node WWN**

  Node world-wide name of the attached device. Must be configured to display.

- **Node Nickname**

  Nickname for the node WWN.

- **Unit Type**

  Refer to *Unit Type* on page 2-27 in Node List View.

- **Node Port Number**

  Physical port number on the attached node (if supplied by the device).

- **Buffer to Buffer Credit**

  The buffer-to-buffer credits that the attached node has available. These credits determine the maximum number of frames a port can transmit without receiving a receive ready signal from the receiving device.

- **Class of Service**

  Class of service. This can be class 2, class 3, or both.

- **Data Field Size**

  Data field size. This is the largest size of Fibre Channel frame the node will process. The size is negotiated with the attached device.

NOTE: *Node Properties* is also available from the menu that displays when you right-click a port's row in the *Port List View* or on a port's bar graph in the *Performance View.*

Performance View

Display the *Performance View* in the view panel by selecting *Performance* from the view tabs in the Product Manager window. This view displays a bar graph at the top of the view for each port. The lower portion of the view displays statistical values for the specific port's bar graph that you select.

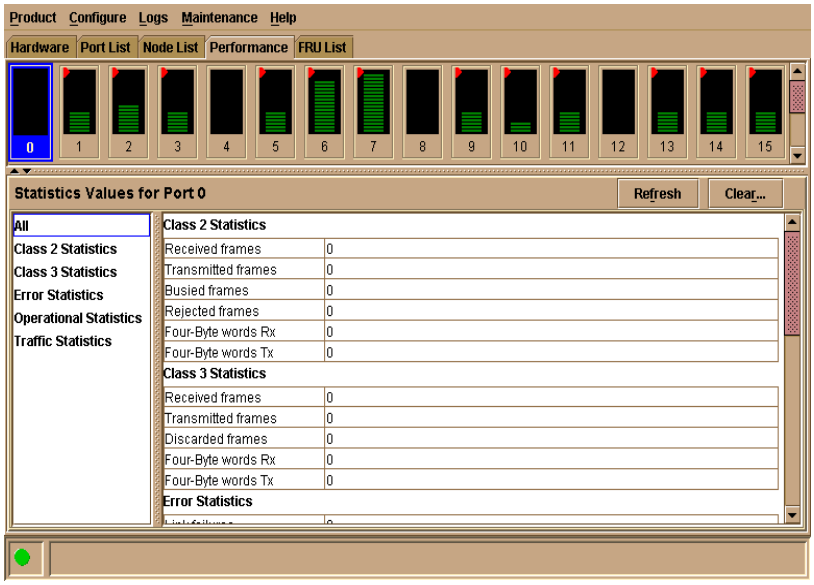


Figure 2-15 Performance View

Menu Options

Right-click any of the port bar graphs to display a menu with the following port-related action options. These are the same menu options that display when you right-click a port in the *Hardware View* or on a row in the *Port List View*. You can also display these options by clicking a port, port row, or port bar graph in the preceding views and selecting the *Port* secondary menu from the *Product* menu on the menu bar.

Refer to *Port Menu* on page 2-17 for an explanation of these menu options.

- *Port Properties*

NOTE: If a node is not logged in, a message displays indicating that node information is not available.

- *Port Technology*
- *Block Port*
- *Enable Beaconing*
- *Port Diagnostics*
- *Clear Link Incident Alert(s)*
- *Reset Port*
- *Port Binding*
- *Clear Threshold Alert(s)*

Bar Graph Display

The *Performance View* provides a graphical display of performance for all ports. Each bar graph in the upper portion of the view panel displays the percentage of link utilization for the port. This information updates every five seconds. A red arrow marks the highest utilization since the opening of the *Performance View*. If the system detects activity on a port, it represents minimal activity with one bar.

When a port is operating as an F_Port and a device is logged on, moving the cursor over the port's bar graph displays a message with the attached port's WWN. If the port is an E_Port, the message reads, "E_Port." If the port is an FL_Port, FL_Port displays. If the port is not logged in, the message displays the port's current operational state (refer to Table 2-1 on page 2-40).

Port Statistics

To select and display more detailed performance information for a port, click the port's bar graph. The bar graph for that port highlights with a darker background and the lower portion of the *Performance View* tab displays the statistics values for the port's number and the WWN decoding. The *Statistics Values* tables contain a menu of specific statistics that can be displayed: *All*, *Class 2 Statistics*, *Class 3 Statistics*, *Error Statistics*, *Operational Statistics*, and *Traffic Statistics*. Click a category in the left frame of the statistics area to display only statistics for that category or click *All* to display values for all categories. For a description of the *Refresh* and *Clear* buttons, refer to *Button Functions* on page 2-39.

Statistics Description

The *Statistics Values* tables contain statistics in the following groups. To refresh tables with the latest data, click the *Refresh* button on the upper right portion of the *Statistics Values* panel or click the port's bar graph. Clear all counters for all users using the *Clear* button.

Class 2 Statistics

The *Class 2 Statistics* table includes:

- **Received Frames**

  The number of Class 2 frames received by this port from its attached port.

- **Transmitted Frames**

  The number of Class 2 frames transmitted by this port to its attached port.

- **Busied Frames**

  The number of F_BSY frames generated by this F_Port against Class 2 frames. This can occur if frames are received before the switch completes initialization or if the switch is servicing so many requests that it can not process a new request. The port generates frames if the switch is not ready to accept commands. This may indicate temporary congestion.

- **Rejected Frames**

  The number of F_RJT frames generated by this F_Port against Class 2 frames.

  These frames usually occur because of attached device errors. The device is expected to correct the error based on the reject code, then retry its request. If the device is able to recover, there is no cause for concern. If not, further troubleshooting may be necessary. There are no thresholds for this value. Typically, this occurs because the destination is not available due to the device's action.

- **Four Byte Words Rx**

  The number of four-byte words received.

- **Four Byte Words Tx**

  The number of four-byte words transmitted.

Class 3 Statistics

The *Class 3 Statistics* table includes:

- **Received Frames**

  The number of Class 3 frames received by this port from its attached port.

- **Transmitted Frames**

  The number of Class 3 frames transmitted by this port to its attached port.

- **Discarded Frames**

  The number of Class 3 frames discarded, including multicast frames with bad D_IDs.

  The switch increments this count when it discards a frame that cannot be routed. This occurs most frequently when a destination becomes unavailable without the source realizing the destination is unavailable. There are no thresholds for this value. Typically, this occurs when the destination is not available due to the destination device's action.

- **Four Byte Words Rx**

  The number of four-byte words received.

- **Four Byte Words Tx**

  The number of four-byte words transmitted.

Error Statistics

Port errors indicate that a port is not operating correctly. Use this data to isolate problems with port and link operations. The statistics in this table include:

- **Link failures**

  A link failure was recorded in response to a not operational sequence (NOS), protocol timeout, or port failure. At the *Hardware View*, a yellow triangle appears to indicate a link incident, or a blinking red and yellow diamond appears to indicate a port failure.

- **Sync losses**

  A loss of synchronization was detected because the attached device was reset or disconnected from the port. At the *Hardware View*, a yellow triangle appears to indicate a link incident.

- **Signal losses**

  A loss of signal was detected because the attached device was reset or disconnected from the port. At the *Hardware View*, a yellow triangle appears to indicate a link incident.

- **Primitive sequence errors**

  An incorrect primitive sequence was received from the attached device, indicating a Fibre Channel link-level protocol violation. At the *Hardware View*, a yellow triangle appears to indicate a link incident.

- **Discarded frames**

  A received frame could not be routed and was discarded because the frame timed out (insufficient buffer-to-buffer credit) or the destination device was not logged into the switch.

- **Invalid transmission words**

  The number of times that the switch detected invalid transmission words from the attached device. This indicates that a frame or primitive sequence arrived at the switch's port corrupted. This corruption can be due to the attached device performing a reset, plugging or unplugging the link, bad optics at either end of the cable, bad cable, or a dirty or poor connection. Moving the connection around or replacing cables can isolate the problem.

  Some number of invalid transmission words are expected and acceptable. Invalid transmission words within a frame are used to produce the bit-error threshold link incident. If one or more invalid transmission words are detected in 12 separate 1.5-second samples within five minutes, a bit-error threshold link incident is generated.

- **CRC errors**

  A received frame failed a cyclic redundancy check (CRC) validation, indicating the frame arrived at the switch's port corrupted. Frame corruption may be caused by device disconnection, an optical transceiver failure at the device, a bad fiber-optic cable, or a poor cable connection.

- **Delimiter errors**

  The number of times that the switch detected an unrecognized start-of-frame (SOF), an unrecognized end-of-frame (EOF) delimiter, or an invalid class of service. This indicates that the frame arrived at the switch's port corrupted. This corruption can be due to plugging/unplugging the link, bad optics at either end of the cable, bad cable, or dirty or poor connections. Moving the connection around or replacing cables can isolate the problem.

- **Address ID errors**

  A received frame had an unavailable or invalid Fibre Channel destination address, or an invalid Fibre Channel source address. This typically indicates the destination device is unavailable.

- **Frames too short**

  A received frame exceeded the Fibre Channel frame maximum size or was less than the Fibre Channel minimum size, indicating the frame arrived at the switch's port corrupted. Frame corruption may be caused by device disconnection, an optical transceiver failure at the device, a bad fiber-optic cable, or a poor cable connection.

Operational Statistics

The following describes the Operational Statistics that display for a selected port:

- **Offline sequences Rx**

  The number of offline sequence that the port has received.

- **Offline sequences Tx**

  The number of offline sequence that the port has transmitted.

- **Link resets Rx**

  The number of link reset protocol frames received by this port from the attached device. The switch receives a link reset from an attached device if the device wishes to initiate the link reset or recover from a link timeout.

- **Link resets Tx**

  The number of link reset protocol frames received/transmitted by this port from/to the attached device. The switch transmits a link reset to initiate the link reset protocol or recover from a link timeout. This occurs normally to establish BB_Credit or on any port in order to recover lost BB_Credit.

- **LIPS detected**

  A loop initialization primitive was detected which means the loop was completed.

- **LIPS generated**

  A loop initialization primitive was created to initialize a loop.

Traffic Statistics with Receive and Transmit Values

This section describes the types of statistics that display when you click a port's bar graph:

- **Link Utilization%**

  There is a separate value for transmit and receive link utilization. The larger of these two values displays on the bar graph.

  The current link utilization for the port is expressed as a percentage. Each port can transmit or receive data at 100 Megabytes (MB) per second. This statistic shows the percentage of the maximum link utilization currently being used. Link utilization is calculated over one-second intervals. The maximum link utilization is 100%.

- **Frames RX**

  The number of frames that the port has received.

- **Frames TX**

  The number of frames that the port has transmitted.

- **Four Byte Words Rx**

  The number of words that the port has received.

- **Four Byte Words Tx**

  The number of words that the port has transmitted.

- **Offline Sequences**

  The number of offline sequence that the port has received or transmitted.

- **Link Resets**

  The number of link reset protocol frames received/transmitted by this port from/to the attached switch. The switch transmits a link reset to initiate the link reset protocol or recover from a link timeout. The switch receives a link reset from an attached device if the device wishes to initiate the link reset or recover from a link timeout.

  There are not thresholds for these values. You may determine that a problem exists by the rate that the value changes.

- **LIPS**

  The number of Loop Initialization Primitives (LIPS) generated/detected by this port. These cause re-initialization of the port.

- **Flows rerouted to ISL**

  The number of Fibre Channel traffic flows that were rerouted to this ISL from another ISL due to congestion. This value increments only if the OpenTrunking feature is installed. A value would only display if this port is connected to an ISL.

- **Flows rerouted from ISL**

  The number of Fibre Channel traffic flows that were rerouted from this ISL to another ISL due to congestion. This value increments only if the OpenTrunking feature is installed. A value would display only if this port is connected to an ISL.

Troubleshooting Tips

As a general rule, you should clear all counts after the system is stabilized. When looking at the *Performance View*, roughly keep track of the time interval when errors accumulate to judge the presence and severity of a problem. Also, recognize that there is a link recovery hierarchy implemented in Fibre Channel to handle some level of "expected anomalies." In general, only be concerned with error counts that increment very quickly.

Button Functions

The two buttons located at the right end of the title bar on the *Statistics Values* table are:

- **Clear**

  The *Clear* button clears all counters to zero. Selecting this button displays a *Clear Port Statistics* dialog box. Select the appropriate radio button and click *OK* to clear all counters to zero on the selected port only or counters on all ports on the switch. Note that this also clears counters for other Product Manager users.

  An entry identifying when the statistics were cleared and by whom is saved in the *Audit Log*.

- **Refresh**

  The *Refresh* button updates the data in the statistics tables and enables you to compare values at any given time. Note that you can also refresh data by clicking the port's bar graph.

  Click *Clear* to clear the statistics counters to zero. When the confirmation dialog box displays, select *This port only* or *All ports on product*, then click *OK* to clear the counters to 0.

Port Operational States

Table 2-1 describes the port operational states and the LED and attention indicators that display in the *Hardware View* and *Port List View*.

Table 2-1 Port States and Indicators

Port State	Port Indicators		Alert Indicatora	Description
	Green/Blue	Amber		
Beaconing	Off or On	Blink	Yellow Triangle	The port is beaconing. The amber port LED blinks once every two seconds to enable users to find a specific port. Enable beaconing through the port's menu on the *Hardware View, Port List View*, or *Performance View*.
Inactive	Off	Off	Yellow Triangle	The switch port is in an inactive state. Reasons for this state appear in the *Reason* field of the *Port Properties* dialog box. Note that if port optics have also failed, the amber LED will be on.
Invalid Attachment	On	Off	Yellow Triangle	The switch port is in an invalid attachment state. Reasons for this state appear in the *Reason* field of the *Port Properties* dialog box.
Link Incident	Off	Off	Yellow Triangle	A link incident occurred on one of the ports and displays in the *Port List View* with a corresponding indicator displaying for the card in the *Hardware View*.
Link Reset	Off	Off	Yellow Triangle	The switch and the attached device are performing a link reset operation to recover the link connection. Ordinarily, this is a transient state that should not persist.
No Light	Off	Off	None	No signal (light) is being received on the switch port. This is a normal condition when there is no cable plugged into the port or when the power of the device attached to the other end of the link is off.
Not Operational	Off	Off	Yellow Triangle	The switch port is receiving the Fibre Channel not operational sequence (NOS) indicating that the attached device is not operational.

Table 2-1 Port States and Indicators (*continued*)

Port State	Port Indicators		Alert Indicatora	Description
	Green/Blue	Amber		
Online	On	Off	None	The attached device has successfully connected to the switch and is ready to communicate or is in the process of communicating with other attached devices. As long as the port remains in the online state, the green/blue port LED remains illuminated. Note that on the actual port in the unit, the green/blue LED blinks when there is active Fibre Channel traffic through the port.
Offline	Off	Off	None	The switch port was configured as "blocked" and is transmitting the Fibre Channel OLS to the attached device.
	Off	Off	Yellow Triangle	The switch port was configured as "Unblocked" and is receiving the Fibre Channel OLS, indicating that the attached device is offline.
Port Failure	Off	On	Red and Yellow Blinking Diamond	The switch port has failed and requires service. The amber LED for the port remains illuminated.
Segmented E_Port	On	Off	Yellow Triangle	The E_Port is segmented preventing the two fabrics from joining (this only occurs when two switches are connected to each other). Display the *Port Properties* dialog box to view the segmentation reason.
Testing	Off	Blink	Yellow Triangle	Port is executing an internal loopback test.
	On	Blink	Yellow Triangle	Port is executing an external loopback test. Note: For any loopback test, the amber LED blinks (beacons) to help users locate the port under test.
Not Installed	Off	Off	Yellow Triangle	The port optics are not installed or the feature that provides additional port function is not enabled.

a. The status indicator displays on the port in the *Hardware View*. It indicates that a corrective action is required to return the port to a normal operating state.

Link Incident Alerts

A link incident is a problem detected on a fiber optic link, like the loss of light, invalid sequences, and other problems. When a problem occurs, a LIN alert is sent to the *Link Incident Log* in the switch Product Manager. LIN alerts warn you that there is a link incident being detected through a port connection that may require operator intervention to correct.

If LIN alerts are enabled for a port in the *Configure Ports* dialog box, a yellow triangle (attention indicator) displays by the port connector in the *Hardware View* or in the *Alert* column in the *Port List View*. A corresponding triangle displays for the card on the *Hardware View*. Double-clicking the port with the yellow triangle displays the *Port Properties* dialog box.

If LIN alerts have been enabled for a port in the *Configure Ports* dialog box, the *Port Properties* dialog box contains a short description of the latest incident in the *Link Incident* field. Or, if there are no active incidents, "None" displays. The system writes all link incidents to the *Link Incident Log*.

If you enable LIN alerts for a port in the *Configure Ports* dialog box, configure e-mail notification through the EFC Manager, and enable *E-Mail Notification* through the *Maintenance* menu, you will receive e-mail notification of LIN alerts.

NOTE: The e-mail notification of LIN alerts is available to all users; no user rights are imposed.

Although you can clear the attention indicator in the *Hardware View* and the alert description in the *Port Properties* dialog box manually, they may also be cleared by actions outside of your control; such as on EFC Server reboot.

You can clear the link incident indicator in the *Hardware View* and the description in the *Link Incident* field manually. To manually clear the attention indicator (yellow triangle), right-click the port with the yellow triangle and select *Clear Link Incident Alert(s)* from the menu. In the *Clear Link Incident Alert(s)* dialog box, select the appropriate option and click *OK*.

Be aware that clearing the incident indicator clears it for everyone using the system. If there are no link incident alerts enabled for a port, no actions occur.

Threshold Alerts

A threshold alert notifies Product Manager users when the transmit (Tx) or receive (Rx) throughput reaches specific values for switch ports or port types (E_Ports, F_Ports, or FL_Ports).

Select the *Threshold Alerts* option on the *Configure* menu to display the *Configure Threshold Alerts* dialog box. Use this dialog box to configure criteria for generating a threshold alert. One criteria that you must configure is a throughput value that equals a specific percentage of the port's total throughput capacity. You also provide a time interval during which throughput is measured and a time interval during which that throughput value must remain constant. When throughput reaches the threshold value and remains constant for the specified time, an alert is generated.

Threshold alerts occur as the following in the Product Manager:

- An attention indicator (yellow triangle) that displays on the port in the *Port Card View*.
- An attention indicator (yellow triangle) that displays on the port card in the *Hardware View*.
- An attention indicator (yellow triangle) that displays in the *Alert* column of the *Port List View*.
- An attention indicator (yellow triangle) that displays by the *Threshold Alerts* field in the *Port Properties* dialog box.
- Detailed threshold alert data recorded in the *Threshold Alert Log*.

For detailed procedures to configure threshold alerts, refer to *Configure Threshold Alerts* on page 3-22.

3

Configuring the Switch

This chapter describes how to use the options that display on the *Configure* menu on the Product Manager menu bar.

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Configure Fabric Parameters	3-7
Configure Switch Binding	3-9
Configure Ports	3-10
Configure SNMP	3-15
Configure Open Systems Management Server	3-17
Configure Feature Key	3-17
Configure Date and Time	3-19
Configure Threshold Alerts	3-22
Configure Open Trunking	3-30
Export Configuration Report	3-30
Enable Web Server	3-31
Backing Up and Restoring Configuration Data	3-32

Configure Identification

Use the procedure in this section to identify the switch by its name, description, location, and contact person. This information displays in the following Product Manager locations:

- Product Manager window title panel (name).
- *Switch Properties* dialog box (name, location, contact, description).
- Identification table at the top of the *Hardware View* (name, location, description).

The name also displays in the switch icon label in the Enterprise Fabric Connectivity (EFC) Manager *Product* tab if the product name is enabled through the EFC Manager *Display Options*.

Data entered through the following procedure is saved in nonvolatile random access memory (NV-RAM) on the switch.

Procedure

To configure identification for the switch, use the following steps:

1. Select *Identification* from the *Configuration* menu on the menu bar.

   The *Configure Identification* dialog box displays.

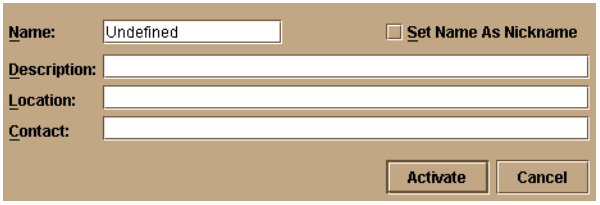


Figure 3-1 Configure Identification Dialog Box

2. Click in the *Name* field and enter a name for the switch. The name could reflect the switch's Ethernet network domain name service (DNS) host name, if assigned.
3. Click in the *Description* field and enter a description of the switch.
4. Click in the *Location* field and enter the location of the switch.
5. Click in the *Contact* field and enter appropriate information about a contact person, such as a phone number, title, or e-mail address.

6. Click *Set Name as Nickname* and add a check mark to the check box if you want to use the name in the *Name* field as a nickname for the switch's WWN. The nickname will then display instead of the WWN in Product Manager views.
7. Click *Activate* to save the data and close the dialog box.
8. If you are finished configuring the switch, back up the configuration data. For more information, refer to *Backup and Restore Configuration* on page 5-7.

Configure Switch Parameters

Use procedures in this section to set parameters on the switch for fabric operation through the *Configure Switch Parameters* dialog box. These operating parameters are stored in NV-RAM on the switch.

1. The switch must be offline to change Preferred Domain ID. If it is not and you activate values in this dialog box, a dialog box displays prompting you to set the unit offline.

CAUTION

Setting the switch offline terminates all Fibre Channel connections.

To set the unit offline:

   a. Select *Set Online State* from the *Maintenance* menu on the menu bar along the top of the Product Manager window.
   b. When the *Set Online State* dialog box displays, click *Set Offline*.
   c. When the warning box displays asking you to confirm the offline state, click *OK*.

2. Select *Switch Parameters* from the *Operating Parameters* submenu (*Configure* menu tab).
3. The *Configure Switch Parameters* dialog box displays.

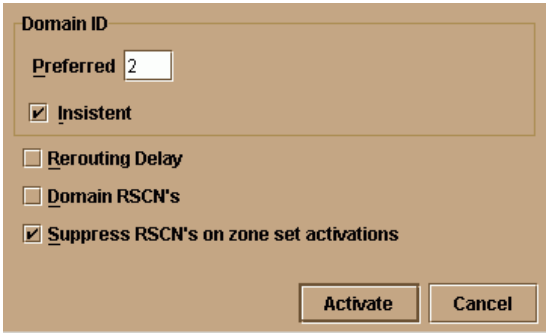


Figure 3-2 Configure Switch Parameters Dialog Box

NOTE: Ordinarily, you do not need to change values in this dialog box from their defaults. The only exception is the *Preferred Domain ID*. Change this value if the switch will participate in a multiswitch fabric.

4. Use information under *Switch Parameters* to change settings as required for parameters in this dialog box.
5. After you change settings, click the *Activate* button.

Switch Parameters

Configure the following parameters as required by your fabric.

Preferred Domain ID

Use this field to set each switch in the fabric to a unique preferred domain ID. Fibre Channel addresses in the switch include this preferred domain ID, which creates a unique identification for the port in the fabric. The default value is 1. Set a preferred value from 1 through 31.

The preferred domain ID must be unique for each switch in a fabric. If two switches have the same preferred domain ID, the E_Ports segment, causing the fabric to segment.

NOTE: For more information on the domain ID, refer to the section on domain ID assignment for multiswitch fabrics in the *McDATA Products in a SAN Environment - Planning Manual* (620-000124).

Insistent

This option is not supported unless the SANtegrity Binding feature is installed. Click the check box to remove or add a check mark. The default state is disabled (no check mark).

When a check mark displays, the domain ID configured in the *Preferred Domain ID* field will become the active domain identification when the fabric initializes. See the following notes:

- This option is required if Enterprise Fabric Mode (optional SANtegrity Binding feature) is enabled. Refer to *Insistent Domain Identification (ID)* on page 6-11 for details.
- If you enable Insistent Domain while the switch or director is online, the Preferred Domain ID will change to the current active domain ID if the IDs are different.

CAUTION

If a switch with a duplicate domain ID exists in the fabric, both switches' E_Ports will segment when they try to join.

Rerouting Delay

Placing a check mark in the check box to the left of the *Rerouting Delay* option enables rerouting delay. This option is only applicable if the configured switch is in a multiswitch fabric. The default state is disabled.

Enabling the rerouting delay ensures that frames are delivered in order through the fabric to their destination. If there is a change to the fabric topology that creates a new path (for example, a new switch is added to the fabric), frames may be routed over this new path if its hop count is less than a previous path with a minimum hop count. This may result in frames being delivered to a destination out of order since frames sent over the new, shorter path may arrive ahead of older frames still in route over the older path.

If rerouting delay is enabled, traffic ceases in the fabric for the time specified in the *E_D_TOV* field of the dialog box. This delay allows frames sent on the old path to exit to their destination before new frames begin traversing the new path.

Domain RSCNs

Use this check box to enable domain register for state change notifications (domain RSCNs). Domain RSCNs are sent between end devices in a fabric to provide additional connection information to host bus adapters (HBA) and storage devices. As an example, this information might be that a logical path has been broken because of a physical event, such as a fiber optic cable being disconnected from a port. Consult with your HBA and storage device vendor to determine if enabling Domain RSCNs will cause problems with your HBA or storage products. For example, some hardware bus adapters (HBAs) may log out, then log back into the fabric when they receive an RSCN, thereby disrupting Fibre Channel traffic.

Note that this option is required if Enterprise Fabric Mode (optional SANtegrity Binding feature) is enabled.

Suppress RSCNs on Zone Set Activations

Fabric format domain register for state change notifications (RSCNs) are sent to ports on the switch following any change to the fabric's active zone set. These changes include activating and deactivating the zone set, or enabling and disabling the default zone. When the Suppress RSCNs on Zone Set Activations checkbox contains a check, fabric format RSCNs are not sent for zone changes to the attached devices on the switch. Click the check box to remove or add a check.

In general, RSCNs should not be suppressed, so that attached devices can receive notification of zoning changes in the fabric. However, some HBAs may log out, then log back into the fabric when they receive an RSCN, thereby disrupting Fibre Channel traffic. Consult with your HBA and storage device vendor to determine if zone set change RSCNs will cause problems with your HBA or storage products.

Configure Fabric Parameters

Use the procedures in this section to configure the following Fibre Channel operating parameters using the *Configure Fabric Parameters* dialog box. The operating parameters are stored in NV-RAM on the switch.

1. The switch must be offline to change parameters in this dialog box. If it is not and you activate values in this dialog box, a dialog box displays prompting you to set the unit offline.

CAUTION

Setting the switch offline terminates all Fibre Channel connections.

To set the unit offline:

   a. Select *Set Online State* from the *Maintenance* menu on the menu bar along the top of the Product Manager window.

   b. When the *Set Online State* dialog box displays, click *Set Offline*.

   c. When the warning box displays asking you to confirm the offline state, click *OK*.

2. Select *Fabric Parameters* from the *Operating Parameters* submenu (*Configure* menu tab).

3. The *Configure Fabric Parameters* dialog box displays.

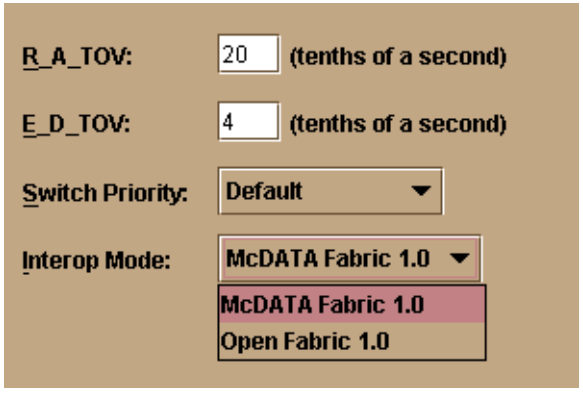


Figure 3-3 Configure Fabric Parameters Dialog Box

NOTE: Ordinarily, you do not need to change values in this dialog box from their defaults. The only exception is the *Preferred Domain ID*. Change this value if the switch will participate in a multiswitch fabric.

4. Use information under *Switch Parameters* to change settings as required for parameters in this dialog box.
5. After you change settings, click the *Activate* button.

Fabric Parameters

Configure the following parameters as required by your fabric.

R_A_TOV

Resource allocation time-out value. This variable is used to time out operations that depend on the maximum possible time that a frame can be delayed in a fabric and still be delivered. Adjust the value for R_A_TOV in tenths of a second (100 ms) increments over a range of 10 tenths (1 second) to 1200 tenths (120 seconds). The default value is 100 tenths (10 seconds).

NOTE: Set the same value for R_A_TOV on all switches on a multiswitch fabric. If the value is not the same on all units, the fabric segments. Also, the value for R_A_TOV must be greater than the value configured for E_D_TOV.

E_D_TOV

Error-detect time-out value: This defines the time that the switch waits for an expected response before declaring an error condition. Configure this value in tenths of a second (100 millisecond) increments in a range of 2 tenths of a second to 600 tenths (60 seconds). The default value is 20 tenths (2 seconds).

NOTE: Set the same value for E_D_TOV on all switches on a multiswitch fabric. If the value is not the same, the fabric segments.

Switch Priority

Setting this value determines the principal switch for the multiswitch fabric. Select either *Principal* (highest priority), *Default*, or *Never Principal* (lowest priority) from the *Switch Priority* drop-down list.

If all switches are set to *Principal* or *Default*, the switch with the highest priority and the lowest WWN becomes the principal switch. Following are some examples of principal switch selection when switches have these settings.

- If you have three switches and set all to *Default*, the switch with the lowest WWN become the principal switch.

- If you have three switches and set two to *Principal* and one to *Default*, the switch with the *Principal* setting that has the lowest WWN becomes the principal switch.
- If you have three switches and set two to *Default* and one to *Never Principal*, the switch with the *Default* setting and the lowest WWN becomes the principal switch.

Note that at least one switch in a multiswitch fabric needs to be set as *Principal* or *Default*. If all of the switches are set to *Never Principal*, all of the interswitch links (ISLs) will segment. If all but one switch is set to *Never Principal* and the switch that was *Principal* goes offline, then all of the other ISLs will segment.

NOTE: We recommend configuring switch priority as *Default*. If you are considering changing this value to something other than the default, refer to sections on principal switch selection for multiswitch fabrics in the *McDATA Products in a SAN Environment - Planning Manual* (620-000124) for details.

In the audit log you may notice that the *Principal* setting maps to a number code of 1, *Default* maps to a number code of 254, and *Never Principal* maps to a number code of 255. The number codes 2-253 are no longer in use.

Interop Mode

Select either *McDATA Fabric 1.0* or *Open Fabric 1.0* mode. Use *Open Fabric 1.0* if the fabric contains McDATA directors and switches and other open-fabric compliant switches. Use this mode to manage heterogeneous fabrics. McDATA recommends using this mode. Use *McDATA Fabric 1.0* if the fabric contains McDATA directors and switches that are also operating in McDATA Fabric 1.0 mode.

Configure Switch Binding

For complete procedures on configuring this optional feature, refer to *SANtegrity Features* on page 6-3.

Configure Ports

Use the procedures in this section to configure names, blocked and unblocked state, 10-100 km extended distance buffering, enable or disable link incident (LIN) alerts for ports, port type, port speed, port binding, and WWN binding name.

Port configuration data is stored in NV-RAM on the switch. The following are descriptions of parameters that you can configure through the *Configure Ports* dialog box. For procedures for using the dialog box, refer to *Configure Ports Procedure* on page 3-13.

Parameter Descriptions

You can configure the following parameters in the *Configure Ports* dialog box.

- **Port #**

  You cannot edit this field. This column identifies the port number. The port numbers range from 0 through 23.

- **Name**

  Enter a name for the port. The port names display in the *Port Properties* dialog box and elsewhere in the Product Manager to identify the port.

  NOTE: To identify port numbers for which you want to provide names, place the cursor over the ports in the *Hardware View*. As you move over a port, a label displays that identifies the slot number where the port is installed.

- **Blocked**

  Placing a check mark in the check boxes of this column blocks the operation of the port.

- **LIN Alerts**

  A link incident (LIN) is a problem detected on a fiber optic link, such as the loss of light or invalid sequences. When a problem occurs, a LIN alert is sent to the *Link Incident Log* in the switch Product Manager. LIN alerts warn you that there is a link incident being detected through a port connection.

Place or remove check marks in the check boxes in this column to enable or disable link incident alerts. The factory default is to enable LIN alerts.

A link incident causes a yellow attention indicator (triangle) to display for the port in the *Hardware View* and in the alert column of the *Port List View*. Once a LIN occurs, you must acknowledge it by selecting the *Clear Link Incident Alert* option from the right-click menu for the port (*Hardware View*). A description of the alert displays in the *Link Incident* field of the *Port Properties* dialog box (refer to Figure 2-3 on page 2-8).

If the check boxes in this column are not selected, no link incident indicators display in the *Hardware View*. Also, the *Link Incident* field of the *Port Properties* dialog box is blank and a link incident is recorded in the *Link Incident Log*. LINs are always logged in the *Link Incident Log*, regardless of the configuration.

If LIN Alerts are enabled, you can receive e-mail notification when a LIN occurs. In order to receive e-mail notification, you must configure and enable this feature in the EFC Manager (*Maintenance* menu) and enable e-mail notification through the *Enable E-Mail Notification* option on the Product Manager's *Maintenance* menu.

For additional information about LIN alerts, refer to *Link Incident Alerts* on page 2-42.

- **FAN**

  Click to display a check mark in the check box and enable Fabric Address Notification for loop devices attached to the port. Right-click in this column to either clear all FANs for all ports or set all FANs for all ports.

- **Type**

  Select each port's type (G_Port, E_Port, F_Port, Fx_Port, or Gx_Port) in this column from the drop-down list. Right-click in this column to set all ports to either, E_Ports, F_Ports, Fx_Ports, G_Ports, or Gx_Ports.

- **Speed**

  Click the *Speed* column for a specific port, and select *2 Gb/sec*, *1 Gb/sec*, or *Negotiate*. This sets the data rate for the port. Selecting *Negotiate* allows the port to negotiate the data speed with an attached device. Only set the speed to 2 Gb/sec on ports that

support this speed. If the port optics do not support 2 Gb/sec, a warning displays stating that the optical transceiver in the port does not support the data rate.

- **Port Binding**

  Click this check box to display a check mark and enable WWN binding for the port. This allows only a specific device to attach to the port. This device is specified by the WWN or nickname entered into the *Bound WWN* column. With the check box cleared, any device can attach to the port even if a WWN or nickname is specified in the *Bound WWN* column. Port binding is allowed only for a port that is either a G_Port, E_Port, or F_Port.

- **Bound WWN**

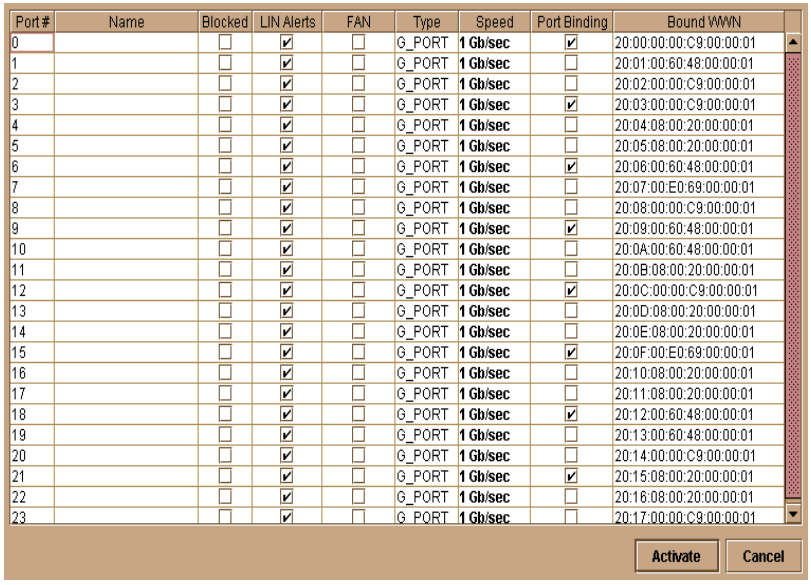
  Enter a world wide name (WWN) in the proper format (xx.xx.xx.xx.xx.xx.xx.xx) or a nickname configured through the EFC Manager application. The device with this WWN or nickname will have exclusive attachment to the port if *WWN Binding* is enabled. If a valid WWN or nickname is not entered in this field, but the *Port Binding* check box is checked (enabled), then no devices can connect to the port. If you enter a WWN or nickname in this field and do not place a check in the *WWN Binding* check box, the WWN or nickname will be stored, and all devices can connect to the port.

Configure Ports Procedure

To configure ports, use the following steps:

1. Select *Ports* from the *Configure* menu on the *Product Manager* menu bar.

   The *Configure Ports* dialog box displays.



Port #	Name	Blocked	LIN Alerts	FAN	Type	Speed	Port Binding	Bound WWN
0		☐	☑	☐	G_PORT	1 Gb/sec	☑	20:00:00:00:C9:00:00:01
1		☐	☑	☐	G_PORT	1 Gb/sec	☐	20:01:00:60:48:00:00:01
2		☐	☑	☐	G_PORT	1 Gb/sec	☐	20:02:00:00:C9:00:00:01
3		☐	☑	☐	G_PORT	1 Gb/sec	☑	20:03:00:00:C9:00:00:01
4		☐	☑	☐	G_PORT	1 Gb/sec	☐	20:04:08:00:20:00:00:01
5		☐	☑	☐	G_PORT	1 Gb/sec	☐	20:05:08:00:20:00:00:01
6		☐	☑	☐	G_PORT	1 Gb/sec	☑	20:06:00:60:48:00:00:01
7		☐	☑	☐	G_PORT	1 Gb/sec	☐	20:07:00:E0:69:00:00:01
8		☐	☑	☐	G_PORT	1 Gb/sec	☐	20:08:00:00:C9:00:00:01
9		☐	☑	☐	G_PORT	1 Gb/sec	☑	20:09:00:60:48:00:00:01
10		☐	☑	☐	G_PORT	1 Gb/sec	☐	20:0A:00:60:48:00:00:01
11		☐	☑	☐	G_PORT	1 Gb/sec	☐	20:0B:08:00:20:00:00:01
12		☐	☑	☐	G_PORT	1 Gb/sec	☑	20:0C:00:00:C9:00:00:01
13		☐	☑	☐	G_PORT	1 Gb/sec	☐	20:0D:08:00:20:00:00:01
14		☐	☑	☐	G_PORT	1 Gb/sec	☐	20:0E:08:00:20:00:00:01
15		☐	☑	☐	G_PORT	1 Gb/sec	☑	20:0F:00:E0:69:00:00:01
16		☐	☑	☐	G_PORT	1 Gb/sec	☐	20:10:08:00:20:00:00:01
17		☐	☑	☐	G_PORT	1 Gb/sec	☐	20:11:08:00:20:00:00:01
18		☐	☑	☐	G_PORT	1 Gb/sec	☑	20:12:00:60:48:00:00:01
19		☐	☑	☐	G_PORT	1 Gb/sec	☐	20:13:00:60:48:00:00:01
20		☐	☑	☐	G_PORT	1 Gb/sec	☐	20:14:00:00:C9:00:00:01
21		☐	☑	☐	G_PORT	1 Gb/sec	☑	20:15:08:00:20:00:00:01
22		☐	☑	☐	G_PORT	1 Gb/sec	☐	20:16:08:00:20:00:00:01
23		☐	☑	☐	G_PORT	1 Gb/sec	☐	20:17:00:00:C9:00:00:01

Activate Cancel

Figure 3-4 Configure Ports Dialog Box

   Ports are numbered from 0 through 23.

2. Click a *Name* field and type a name that reflects the end device connected through the port. For example, use "XYZ Server," where *XYZ* is the brand name of the server.

3. Block or unblock operation for a port by clicking the check box in the *Blocked* column. When a check mark displays, the port is blocked.

4. Enable or disable LIN alerts for the port by clicking the check box in the *LIN Alerts* column. When a check mark displays, LIN alerts are enabled.

   NOTE: The factory default for LIN alerts is enabled.

5. Click the check box in the FAN column to enable Fabric Address Notification for loop devices.
6. Select a port type by clicking in the *Type* field and selecting from the list.
7. Select a port speed by clicking in the *Speed* field and selecting from the list.
8. To bind a device with a specific WWN or nickname to the port, click the *Port Binding* check box to display a check mark. Then enter the WWN or configured nickname for the device into the *Bound WWN* column. The device that you bind to the port will have exclusive connection to that port.

   NOTE: To configure port binding, you must enable the Port Binding feature using the appropriate feature code through the *Configure Feature Key* dialog box.

   Notes:

   - If you have configured port binding and click *Activate*, a warning dialog box displays if one or more of the nodes attached to a port does not match the WWN or nickname configured in the *Bound WWN* column. This warning box displays a list of all attached nodes that will be logged off if you continue. If you click *Continue*, these nodes will log off and the port will only attach to the device with the WWN or nickname configured in the *Bound WWN* column.
   - If you have configured port binding and click *Activate*, an error message may display if the format for the WWN entered in the *Bound WWN* column is not valid (not in xx.xx.xx.xx.xx.xx.xx.xx format) or if you enter a nickname that has not been configured through the Product or Fabric Manager.
9. Use the scroll bar on the right side of the *Configure Ports* dialog box table to display additional ports that you want to configure.
10. Activate changes and close the dialog box by clicking *Activate*.
11. If you are finished configuring the switch, back up the configuration data. For more information, refer to *Backing Up and Restoring Configuration Data* on page 3-32.

Configure SNMP

Use the procedures in this section to:

- Configure the SNMP agent that runs on the switch and implements the following MIBs:
  - — MIB-II
  - — Fabric Element MIB
  - — Fibre Alliance (FCMGMT) MIB
  - — Switch private MIB

  For complete information on objects defined in MIBs and steps to download MIB variables to your SNMP workstation, refer to the *SNMP Support Manual* (620-000131).
- Configure network addresses and community names for up to six SNMP trap recipients.

  An SNMP trap recipient is a network management station that receives messages through SNMP for specific events that occur on the switch.

  To enable or disable authorization trap messages to be sent when unauthorized management stations try to access SNMP information through the EFC Server, select the Enable Authorization Traps check box. A check mark in the box enables this option.
- Define SNMP community names that SNMP managers use for reading variables.
- Authorize write permissions for writable MIB variables.

NOTE: SNMP managers may request, but will not receive, traps and SNMP data through SNMP management stations that are not configured with community names.

Procedure

To configure SNMP traps and assign community names, use the following steps:

1. Select *SNMP* from the *Configure* menu on the menu bar.

   The *Configure SNMP* dialog box displays.

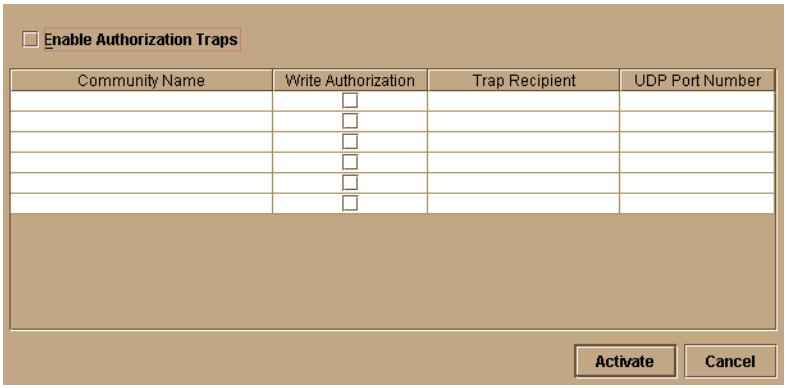


Figure 3-5 Configure SNMP Dialog Box

2. Click the *Enable Authorization Traps* field to enable authorization traps to be sent to SNMP management stations when unauthorized stations try to access SNMP information from the switch.
3. Click a field in the *Community Name* column to select the row. Enter the SNMP community name for the trap recipient. Enter up to 32 characters. This also defines community names from which SNMP managers can read MIB variables from or write MIB variables to the switch. Refer to the note under *Configure SNMP* on page 3-15 for more information about assigning community names.
4. Click the *Write Authorization* check box to enable write authorization for the community name. A check mark displays in the box to indicate that write authorization is enabled.
5. Enter the IP address for a trap recipient (SNMP management station) by clicking in the *Trap Recipient* column and entering an IP address.

NOTE: Step 6 is usually are not necessary. If you do not wish to override the default UDP number, skip to step 7.

6. Enter user datagram protocol (UDP) port numbers in the *UDP Port Number* column. You can override the default UDP port number of 162 with any legal UDP port number (1 to 65535).
7. Click *Activate* to activate the data and close the dialog box.

   The SNMP configuration is stored in NV-RAM on the switch.
8. If you are finished configuring the switch, back up the configuration data. For more information, refer to *Backup and Restore Configuration* on page 5-7.

Configure Open Systems Management Server

For complete procedures on configuring this optional feature, refer to refer to *Configure Open Systems Management Server* on page 6-2.

Configure Feature Key

A feature key is a string of alphanumeric characters consisting of both uppercase and lowercase. The following is an example of a feature key format: XxXx-XXxX-xxXX-xX.

NOTE: The total number of characters may vary. The key is case sensitive and must be entered exactly, including the dashes.

NOTE: You can configure a feature key with the switch online. However, if a current feature is disabled by activating a new feature key, you should take the switch offline before enabling the new feature key.

The feature key, which is encoded with a switch's serial number, can only be configured on the switch to which it is assigned.

To enable an optional feature on the switch, enter the feature key into the *New Feature Key* dialog box. Display this dialog box by selecting *Feature* from the *Configure* menu on the menu bar.

NOTE: For detailed descriptions of features that you can enable using the *Configure Feature Key* dialog box, refer to Chapter 6, *Optional Features*.

Procedure

To configure a feature key, use the following steps:

1. Set the switch offline using the Set Online State dialog box. For help, refer to *Set Online State* on page 5-4.

NOTE: You do not need to set the switch offline to install a feature key, unless some feature functionality is being removed. If you are adding features or ports, you do not need to take the switch offline.

2. Select *Features* from the *Configure* menu on the menu bar.

   The *Configure Feature Key* dialog box displays.

Figure 3-6 Configure Feature Key Dialog Box

3. Click *New* to add a new feature key.
4. In the *New Feature Key* dialog box, enter the switch's feature key and click *OK*.
   - Feature keys are only valid for a switch with a specific serial number. They cannot be interchanged between switches. If an error stating "Invalid serial number" displays, verify that you have entered the feature key that was assigned to the switch. To verify, check the serial number of the switch through the *Switch Properties* dialog box and compare it to the serial number listed in the documentation provided with your feature key. Refer to *Displaying Switch Information* on page 2-12 for instructions on displaying the *Switch Properties* dialog box.
   - The feature key is a string of alphanumeric characters with dashes. The key is case-sensitive, so enter the key exactly as printed in the documentation that you received for the feature. If an error stating "Invalid feature key" displays, verify that you have entered the feature key correctly.

The *Enable Feature Key* dialog box displays with a warning, stating that this action will override the current set of features on the switch. The list in the left column of the dialog box is a list of features that are active on the switch. The list on the right is a set of features that come with the new feature key. All of the features that are active are included in the new feature list.

5. Click *Activate* to activate the new feature key.

   An IPL will occur, during which the Ethernet connection between the EFC Server and switch is momentarily interrupted. This will not disrupt Fibre Channel traffic.

NOTE: If you click *Activate*, all current features will be replaced with new features. That is, if there are features shown in the current list that are not shown in the new list, then those features will be removed from the switch.

6. Set the switch back online, if you set it offline in step 1.
7. When you are finished configuring the switch, you can back up the configuration data. For more information, refer to *Backing Up and Restoring Configuration Data* on page 3-32.

Configure Date and Time

Use the procedures in this section to display and change the date and time set on the switch. You must set the current date and time on the switch using this dialog box so the correct time stamps display in the *Event Log*, *Audit Log*, *Hardware Log*, *Link Incident Log*, and *Threshold Alerts Log*.

Procedure

Set the switch date and time using the following steps:

1. Select *Date/Time* from the *Configure* menu on the menu bar.

   The *Configure Date and Time* dialog box displays.

   If the *Periodic Date/Time Synchronization* check box in the *Configure Date and Time* dialog box is selected, the EFC Server periodically synchronizes the switch time to the EFC Server, and daylight savings time automatically updates. When the *Periodic Date/Time Synchronization* option is selected, the *Date* and *Time* fields are disabled (grayed out).

If the *Periodic Date/Time Synchronization* check box is not selected, you can set the EFC Server date and time manually.

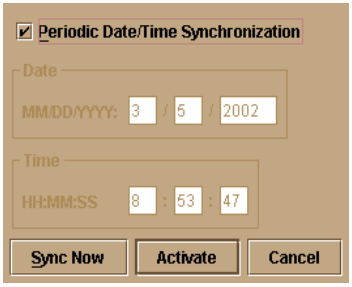


Figure 3-7 Configure Date and Time Periodic Synchronization Dialog Box

To disable *Periodic Date/Time Synchronization*, click the check box to remove the check mark, then click *Activate*. To re-enable *Periodic Date/Time Synchronization*, click the check box to display the check box, then click *Activate*.

NOTE: Click *Activate* to synchronize the date and time at the next update period. Click *Sync Now* to synchronize the date and time immediately.

---

2. Perform one of the following options:

   Option 1: To immediately synchronize the switch date and time with the EFC Server, click *Sync Now*. Make sure that a check mark is in the *Periodic Date/Time Synchronization* check box.

   NOTE: If you click *Activate*, the date and time synchronize at the next update period.

   Option 2: To synchronize the switch date and time with a specific date and time that you enter:

   a. Make sure that *Periodic Date/Time Synchronization* is disabled (no check). Refer to Figure 3-8.

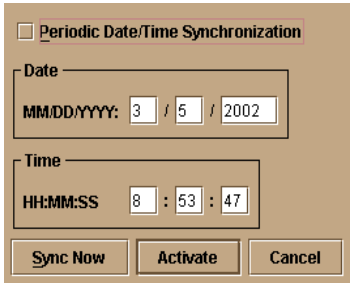


Figure 3-8 Configure Date and Time Manually

b. Click in a *Date* or *Time* field that you want to change.

c. Delete characters and enter new ones as required or highlight the existing character by clicking and dragging the mouse cursor over the character and typing the new character.

NOTE: When entering the hours, use the range of 0 to 23, for minutes and seconds, use the range of 0 to 59.

---

d. Click *Activate* to set the date and time on the switch.

3. If you are finished configuring the switch, back up the configuration data. For more information, refer to *Backing Up and Restoring Configuration Data* on page 3-32.

Configure Threshold Alerts

A threshold alert notifies users when the transmit (Tx) or receive (Rx) throughput reaches specified values for specific switch ports or port types, (E_Ports, F_Ports, or FL_Ports).

You are notified of a threshold alert by:

- An attention indicator (yellow triangle) that displays on the port in the *Hardware View.*
- An attention indicator (yellow triangle) that displays in the *Alert* column of the *Port List View.*
- An attention indicator (yellow triangle) that displays by the *Threshold Alerts* field in the *Port Properties* dialog box.
- Detailed threshold alert data recorded in the *Threshold Alert Log*.

Use the *Threshold Alerts* option on the *Configure* menu to configure the following:

- Name for the alert.
- Type of threshold for the alert (Rx, Tx, or either).
- Active or inactive state of the alert.
- Threshold criteria:
  - — Percent traffic capacity utilized. This is the percent of the port's throughput capacity achieved by the measured throughput. This setting constitutes the threshold value. For example the value of 50 means that the port's threshold is reached when throughput is 50% of capacity.
  - — Time interval during which throughput is measured and alert notification can occur.
  - — The maximum cumulative time that the throughput percentage can be exceeded during the set time interval before an alert is generated.
- Ports for which you are configuring threshold alerts.

You can configure up to 16 alerts, and any number of alerts can be active at one time.

Procedures

Use the following procedures to create a new threshold alert, or to modify, activate, deactivate, or delete an alert.

Create New Alert

1. Select *Threshold Alerts* from the *Configure* menu on the menu bar.

   The *Configure Threshold Alerts* dialog box displays.

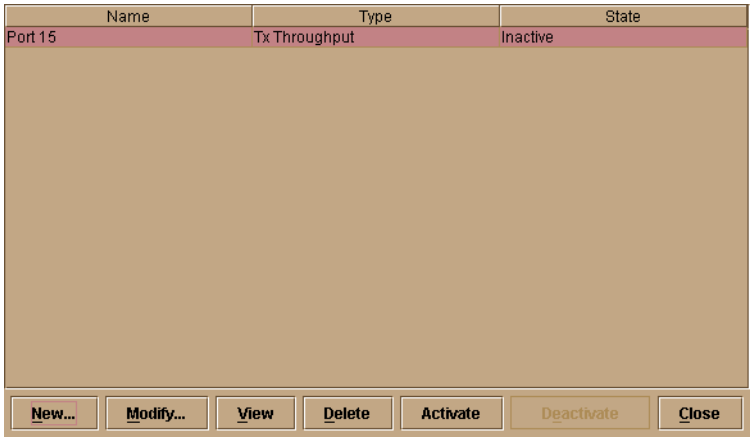


Figure 3-9 Configure Threshold Alerts Dialog Box

   If alerts are configured, they will display in table format showing the name of the alert, type of alert (Rx, Tx, or Rx or Tx), and alert state (inactive or active).

2. Click *New.*

   The *New Threshold Alert* dialog box displays.

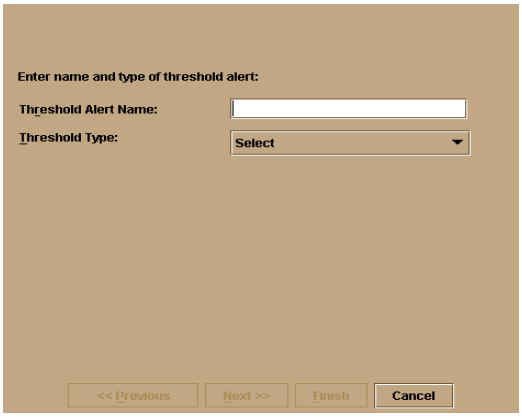


Figure 3-10 New Threshold Alerts Dialog Box - First Screen

3. Enter a name from one to 64 characters in length. All characters in the ISO Latin-1 character set, excluding control characters, are allowed.
4. Select one of the following from the drop-down list under the *Name* field:
   - *Rx Throughput*. An alert will occur if the threshold set for receive throughput is reached.
   - *Tx Throughput*. An alert will occur if the threshold set for transmit throughput is reached.
   - *Rx or Tx Throughput*. An alert will occur if the threshold set for either receive or transmit throughput is reached.
5. Click *Next*.

   A new screen appears with additional parameters. The name configured for the alert appears at the top of the screen.

   (Click *Previous* to return to the previous screen.)

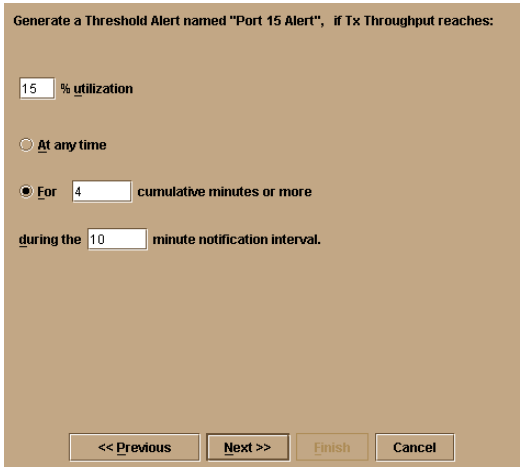


Figure 3-11 New Threshold Alerts Dialog Box - Second Screen

6. Enter a percentage from 1 through 100 for *% utilization*. When throughput reaches this percentage of port capacity, a threshold alert will occur.
7. Enter the amount of cumulative minutes in which the *% utilization* should exist during the notification interval before an alert is generated. You can also select *At any time* if you want an alert to occur whenever the set *% utilization* is reached. The valid range is 1 to the interval set in step 8 (following).
8. Enter the interval in minutes in which throughput is measured and threshold notifications can occur. The valid range is 5 minutes to 70,560 minutes.
9. Click *Next*.

   A new screen appears for selecting ports for the alerts.

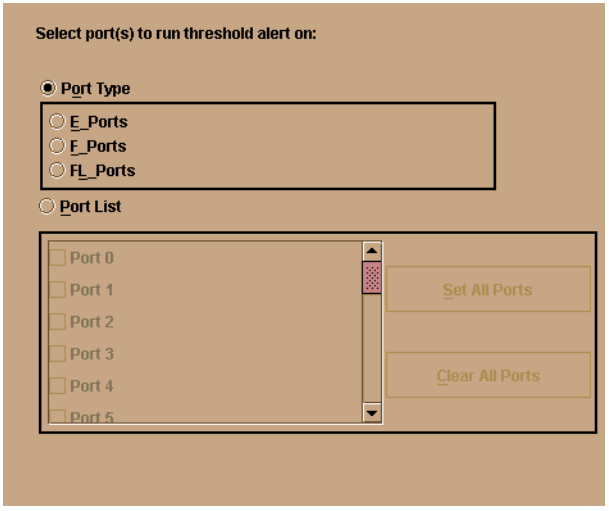


Figure 3-12 New Threshold Alerts Dialog Box - Third Screen

10. Either select Port Type or Port List.
    - If you select *Port Type*, selecting either E_Ports, F_Ports, or FL_Ports will cause this alert to generate for all ports configured as E_Ports, F_Ports, or FL_Ports respectively.
    - If you select *Port List*, you can select individual ports by clicking the check box by each port number or set all ports. Selecting *Set All Ports* places a check mark by each port number. Selecting *Clear All Ports* will clear the check marks by each port number.

11. Click *Next*.

    A final screen appears to provide a summary of your alert configuration. To make any changes, backwards and forwards through the configuration screens by selecting the *Previous* and *Next* buttons.

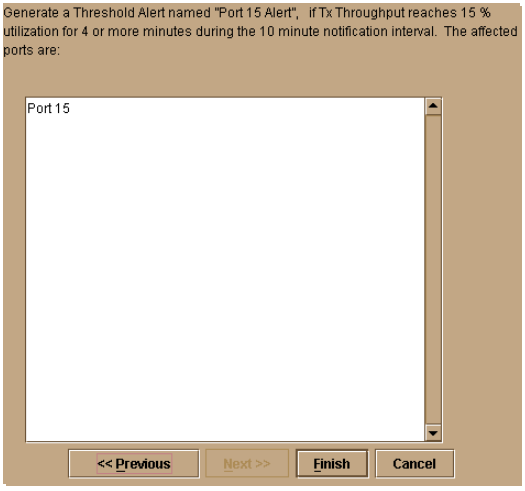

Generate a Threshold Alert named "Port 15 Alert", if Tx Throughput reaches 15 % utilization for 4 or more minutes during the 10 minute notification interval. The affected ports are:
Port 15
<< Previous
Next >>
Finish
Cancel

Figure 3-13 New Threshold Alerts Dialog Box - Summary Screen

12. Select *Finish*.

    The *Configure Threshold Alerts* dialog box appears listing the name, type, and state of the alert that you just configured.

13. At this point, the alert is not active. To activate the alert, select the alert information that displays in the *Configure Threshold Alerts* table and select *Activate*.

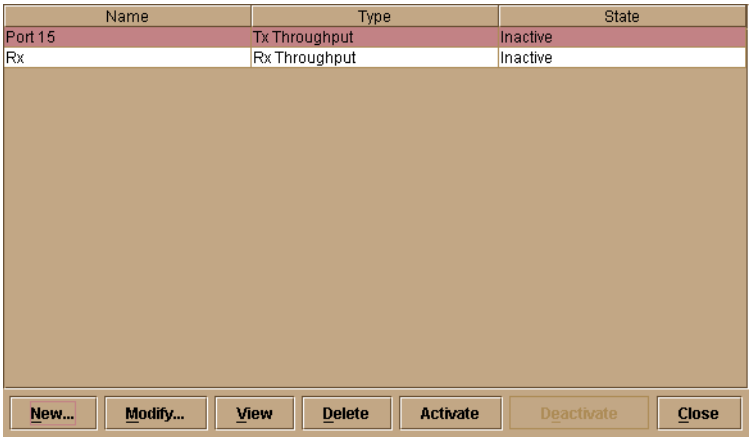


Figure 3-14 Configure Threshold Alerts Dialog Box - Alerts Activated

Modify an Alert

Use the following steps to modify an existing threshold alert configuration.

1. Select *Threshold Alerts* from the *Configure* menu.

   The *Configure Threshold Alerts* dialog box displays.

2. Select the alert that you want to modify by clicking the alert information in the table.
3. If the alert is active, select *Deactivate*, then select the alert information in the table again.
4. Select *Modify*.

   NOTE: If the alert is active, an error message displays prompting you deactivate the alert.

   An initial *Modify Threshold* screen appears where you can change the threshold type.

5. Select a threshold type from the drop-down list.
6. Select *Next* when you are done. A *Modify Threshold* screen appears where you can change the % utilization, cumulative minutes for the threshold to occur before notification, and the time interval for measuring throughput and for alert notification.

7. Make appropriate changes, then continue through the *Modify Threshold* screens, making changes as necessary, until the summary screen appears displaying the alert configuration.
8. Perform either of the following steps:
   - If you need to change any parameters, select *Previous* and *Next* to display the desired *Modify Threshold* screen.
   - Select *Finish* when you are done.

Activate or Deactivate Alerts

Use the following steps to activate or deactivate existing threshold alerts. In the active state, notifications are generated for the alert. In the inactive state, notifications do not occur.

1. Select *Threshold Alerts* from the *Configure* menu.

   The *Configure Threshold Alerts* dialog box displays. The port's current state, deactive or active, is listed under the *State* column.
2. To change the state, select the alert information in the table.
3. If the alert is active, select *Deactivate* to change to the deactive state. If the alert is deactive, select *Activate* to change to the active state.

Delete Alerts

Use the following steps to delete existing threshold alerts.

1. Select *Threshold Alerts* from the *Configure* menu.

   The *Configure Threshold Alerts* dialog box displays.
2. Select the alert that you want to delete by selecting the alert information in the table.
3. Select *Delete*.

   A message displays asking you to confirm the deletion.
4. Select Yes.

   The alert is removed from the dialog box.

Configure Open Trunking

This option is only available if the optional OpenTrunking feature is installed and the firmware is version 05.00.00 or higher. Selecting this option opens the *Configure Open Trunking* dialog box. For details on enabling OpenTrunking and configuring such parameters as congestion thresholds for ports, event notification options, and the Low BB Credit Threshold, refer to *OpenTrunking* on page 6-12.

Export Configuration Report

Use this option to save an ASCII file of all currently saved configuration data in switch NV_RAM to your hard drive or a diskette. Use any desktop publishing application to import this ASCII file for viewing or printing.

NOTE: This file cannot be used to set configuration parameters through the Product Manager.

Data in the file includes:

- **Product identification**

  Data input into the *Configure Identification* dialog box.

- **Operating parameters**

  Data input into the *Operating Parameters (Switch and Fabric)* dialog box.

- **Port parameters**

  Data input into the *Configure Ports* dialog box.

- **SNMP parameters**

  Data input into the *Configure SNMP* dialog box.

- **Active zoning configuration**

  This specifies the active zone and zone members, if set, and whether the default zone is enabled or disabled.

Procedure

To export a configuration report:

1. Select *Export Configuration Report* from the *Configure* menu on the menu bar.

   The *Export Configuration Report* dialog box displays.

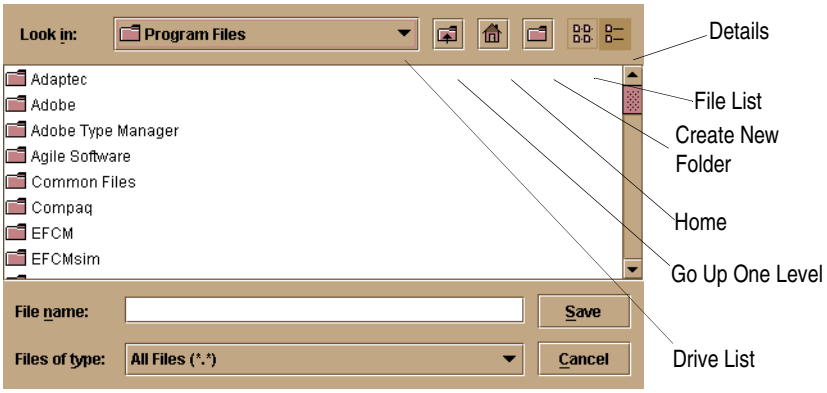


Figure 3-15 Export Configuration Dialog Box

2. Select the folder where you want to save the file.
3. Type in a file name and extension in the *File name* field.
4. Click *Save*.

   The file saves to the specified folder as an ASCII text file.

Enable Web Server

Select this option from the *Configure* menu on the menu bar to place a check mark in the check box to enable the SANpilot Interface on the switch. Select the option again to remove the check mark and disable the SANpilot Interface. When disabled, users at remote workstations cannot access the interface.

Backing Up and Restoring Configuration Data

You can back up the NV-RAM configuration, which includes all of the data you input through instructions in this chapter, using the *Backup and Restore Configuration* option. This option is available through the *Maintenance* menu. Selecting this option backs up the configuration data to a file on the EFC Server hard drive. The restore function writes this data back to NV-RAM on the switch. Using the restore function overwrites the existing configuration. For more information, refer to *Backup and Restore Configuration* on page 5-7.

In addition to the *Backup and Restore Configuration* option, the Iomega QuikSync application backs up configuration and other critical data from the EFC Server automatically. As long as a Zip disk remains in the Zip drive of the EFC Server, data backs up to the Zip disk whenever the directory contents change or you reboot the EFC Server.

NOTE: We do not recommend changing the default QuikSync settings.

NOTE: The QuikSync application and a Zip drive may not be available if you are using a customer-supplied server platform for the EFC Management applications.

NOTE: To ensure trouble-free backups; it is imperative that you leave the Zip drive connected to the EFC Server, and leave a Zip disk in that drive at all times. Removing the disk during a backup or restore can corrupt the database on the disk. Make sure that data is not being written to or read from the Zip drive before you remove the Zip disk. The Iomega QuikSync icon, Figure 1-11 on page 1-39, in the Windows system tray spins when data is writing to or reading from the drive.

4

Using Logs

This chapter describes the Sphereon 4500 Fabric Switch logs that you can access through the *Logs* menu on the Product Manager menu bar:

Section	Page
Using Logs	4-2
Audit Log	4-4
Event Log	4-6
Hardware Log	4-8
Link Incident Log	4-9
Threshold Alert Log	4-11
Open Trunking Log	4-12

Using Logs

The Audit, Event, Hardware, and Link Incident, and Threshold Alert logs store up to 1000 entries each. The most recent entry displays at the top of the log. After 1000 entries are stored, new entries overwrite the oldest entries.

Button Function

Button function is the same for all logs:

- **Clear**

  Clicking the *Clear* button clears all entries in the log for all users. A *Warning* dialog box displays requesting confirmation that you want to clear all entries in the log.

- **Refresh**

  Clicking the *Refresh* button reads the current data and refreshes the screen with the new display.

- **Close**

  Closes the log and displays the switch Product Manager window.

- **Export**

  Clicking the *Export* button on a log window displays the *Save* dialog box shown in Figure 4-1 on page 4-3. Click the *Home* icon to return to the files in your home directory. The folders that list in the display area of the *Save* dialog box after clicking the *Home* icon are those that are stored in your home directory. If you choose, you may create a folder for your home directory and save the file there.

  To save a log file in American Standard Code for Information Exchange (ASCII) format to a location on your system's hard drive or to a diskette, use the following steps. You can open this file in any desktop publisher for viewing or printing.

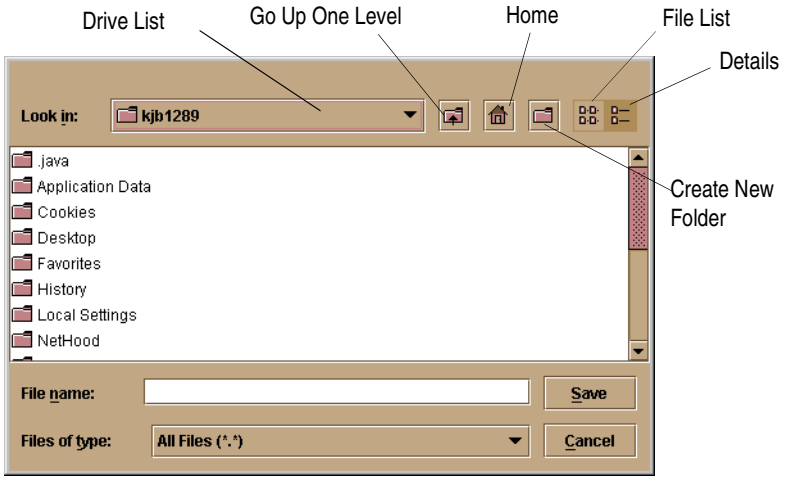


Figure 4-1 Save Dialog Box

1. Click *Export* on the log window.
2. In the *Save* dialog box, select the folder where you want to save the file.
3. Type in a file name and extension in the *File name* field.
4. Click *Save*.

The file saves to the specified folder as an ASCII text file.

Expanding Columns

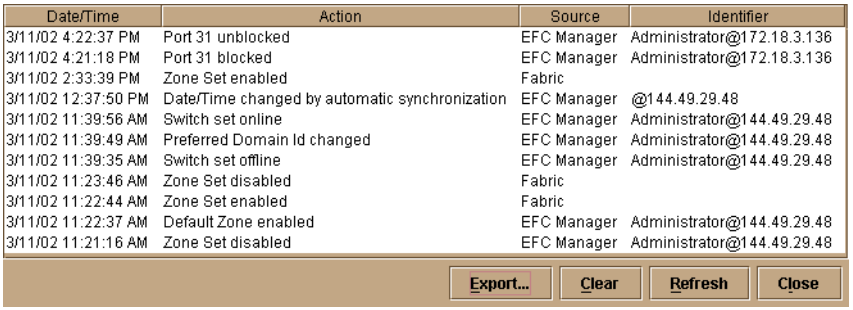
Expand columns in logs by placing the cursor over the line separating column headings until a double arrow appears, then click and drag the line to widen the column as necessary.

Sorting Entries

Sort log entries in columns by clicking a column heading. A down arrow displays in the heading, if sorting alphabetically in descending order. An up arrow indicates sorting in ascending order. Click once to sort. Click again to reverse the sort.

Audit Log

The audit log displays a history of all configuration changes applied to the switch from any source such as Product Manager, SNMP management stations, web server interface, host, or another switch.



Date/Time	Action	Source	Identifier
3/11/02 4:22:37 PM	Port 31 unblocked	EFC Manager	Administrator@172.18.3.136
3/11/02 4:21:18 PM	Port 31 blocked	EFC Manager	Administrator@172.18.3.136
3/11/02 2:33:39 PM	Zone Set enabled	Fabric	
3/11/02 12:37:50 PM	Date/Time changed by automatic synchronization	EFC Manager	@144.49.29.48
3/11/02 11:39:56 AM	Switch set online	EFC Manager	Administrator@144.49.29.48
3/11/02 11:39:49 AM	Preferred Domain Id changed	EFC Manager	Administrator@144.49.29.48
3/11/02 11:39:35 AM	Switch set offline	EFC Manager	Administrator@144.49.29.48
3/11/02 11:23:46 AM	Zone Set disabled	Fabric	
3/11/02 11:22:44 AM	Zone Set enabled	Fabric	
3/11/02 11:22:37 AM	Default Zone enabled	EFC Manager	Administrator@144.49.29.48
3/11/02 11:21:16 AM	Zone Set disabled	EFC Manager	Administrator@144.49.29.48

Figure 4-2 Audit Log

- **Date/Time**

  The date and time of the change on the switch.

  Some actions, such as backing up configuration data and enabling automatic date/time synchronization, are performed only by the EFC Server without switch interaction. These actions are indicated by the string, (EFC), following the audit log's stamp of the EFC Server's date and time (refer to Figure 4-2). If the string, (EFC), is not displayed, the time stamp is from the switch.

- **Action**

  User action that caused the configuration change, such as offline status, port name change, or change of address.

- **Source**

  Identifies the user making the change through the switch Product Manager and IP or DNS host name address of the remote user's workstation.

  — Maintenance Port: Change was made by a user connected to the maintenance port.

  — EFC Manager: Change was made by an Product Manager user.

— SNMP: Change was made by a remote SNMP management station.

— Fabric: Change was initiated by another switch in the fabric that is not managed by this EFC Server.

— Web server: Change was made by a user through the SANpilot Interface.

— Fibre Channel Host: Change was made inband by a Fibre Channel host through the Open Systems Management Server.

— Telnet: Change was made through a telnet connection.

- **Identifier**

  Identifies the user making the change according to the source:

  — Maintenance Port: No entry displays.

  — EFC Manager: Includes user@address, where "user" is the Product Manager user name and "address" is the network address of the workstation (remote user workstation or EFC Server).

  — SNMP: Contains the network address of the SNMP management station.

  — Fabric: No entry displays.

  — Web Server: The *Identifier* column contains user@address, where "user" is the web server user name and "address" is the network address of the web user.

  — Fibre Channel Host: No entry displays.

  — Telnet: Change was made through a telnet connection.

Event Log

The event log provides a record of significant events that have occurred on the switch, such as hardware failures, degraded operation, and port problems.

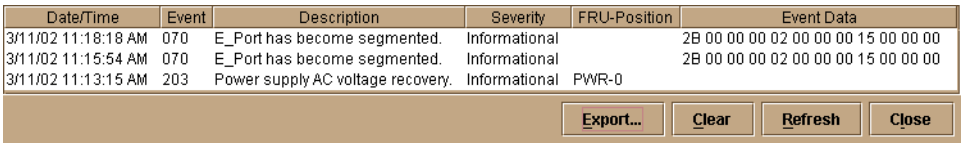

Date/Time
Event
Description
Severity
FRU-Position
Event Data
3/11/02 11:18:18 AM 070 E_Port has become segmented. Informational 2B 00 00 00 02 00 00 00 15 00 00 00
3/11/02 11:15:54 AM 070 E_Port has become segmented. Informational 2B 00 00 00 02 00 00 00 15 00 00 00
3/11/02 11:13:15 AM 203 Power supply AC voltage recovery. Informational PWR-0
Export...
Clear
Refresh
Close

Figure 4-3 Event Log

All detected firmware faults and hardware failures are sent to the EFC Server for recording in the event log. The log provides a maximum of 1000 log entries before it wraps and overwrites the oldest entries.

For detailed information on event data and problem resolution, refer to the *McDATA Sphereon 4500 Fabric Switch Installation and Service Manual* (620-000159).

Each log entry includes the following:

- **Date/Time**

  The date and time of the event on the switch.

- **Event**

  Events are identified by a unique code.

  Event codes include:

000 - 199	System events
200 - 299	Power supply events
300 - 399	Fan module events
400 - 499	CTP events
500 - 599	Port events
800-899	Thermal events

- **Description**

  A short description of the event.

- **Severity**

  There are four classifications of severity that identify the importance of the event.

  Informational

  Minor

  Major

  Severe

- **FRU Position**

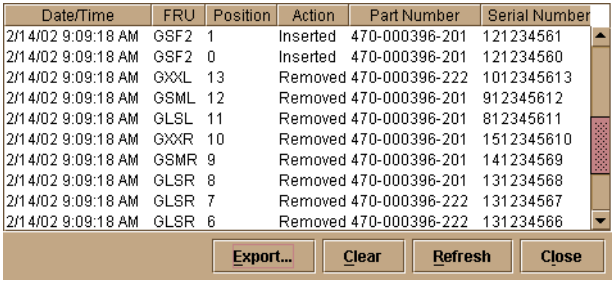
  The FRU involved in the event and the slot position in the chassis relative to identical FRUs installed.

- **Event Data**

  Up to 32 bytes of supplementary information for the event in hexadecimal format. For detailed information on event data and problem resolution, refer to the *McDATA Sphereon 4500 Fabric Switch Installation and Service Manual* (620-000159).

Hardware Log

The hardware log displays information field replaceable units (FRUs) inserted and removed from the switch.



Date/Time	FRU	Position	Action	Part Number	Serial Number
2/14/02 9:09:18 AM	GSF2	1	Inserted	470-000396-201	121234561
2/14/02 9:09:18 AM	GSF2	0	Inserted	470-000396-201	121234560
2/14/02 9:09:18 AM	GXXL	13	Removed	470-000396-222	1012345613
2/14/02 9:09:18 AM	GSML	12	Removed	470-000396-201	912345612
2/14/02 9:09:18 AM	GLSL	11	Removed	470-000396-201	812345611
2/14/02 9:09:18 AM	GXXR	10	Removed	470-000396-201	1512345610
2/14/02 9:09:18 AM	GSMR	9	Removed	470-000396-201	141234569
2/14/02 9:09:18 AM	GLSR	8	Removed	470-000396-201	131234568
2/14/02 9:09:18 AM	GLSR	7	Removed	470-000396-222	131234567
2/14/02 9:09:18 AM	GLSR	6	Removed	470-000396-222	131234566

Export... Clear Refresh Close

Figure 4-4 Hardware Log

Each log entry includes the following:

- **Date/Time**

  Date and time of the insertion or removal of the FRU.

- **FRU**

  The name of the inserted or removed FRU.

PWR	Power supply/fan module
SFP	SFP transceiver.
CTP	CTP card. Note: The CTP is not a FRU.

- **Position**

  Slot position in the chassis relative to identical components installed.

- **Action**

  Inserted or removed.

- **Part Number**

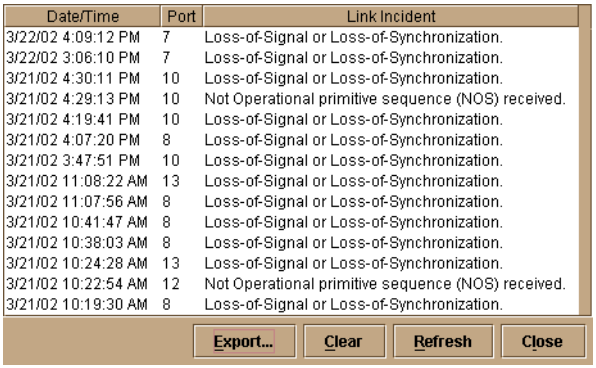
  Part number of the component.

- **Serial Number**

  Serial number of the component.

Link Incident Log

The link incident log displays a thousand of the most recent link incidents, the date each incident occurred, the time it occurred, and the port where it took place.



Date/Time	Port	Link Incident
3/22/02 4:09:12 PM	7	Loss-of-Signal or Loss-of-Synchronization.
3/22/02 3:06:10 PM	7	Loss-of-Signal or Loss-of-Synchronization.
3/21/02 4:30:11 PM	10	Loss-of-Signal or Loss-of-Synchronization.
3/21/02 4:29:13 PM	10	Not Operational primitive sequence (NOS) received.
3/21/02 4:19:41 PM	10	Loss-of-Signal or Loss-of-Synchronization.
3/21/02 4:07:20 PM	8	Loss-of-Signal or Loss-of-Synchronization.
3/21/02 3:47:51 PM	10	Loss-of-Signal or Loss-of-Synchronization.
3/21/02 11:08:22 AM	13	Loss-of-Signal or Loss-of-Synchronization.
3/21/02 11:07:56 AM	8	Loss-of-Signal or Loss-of-Synchronization.
3/21/02 10:41:47 AM	8	Loss-of-Signal or Loss-of-Synchronization.
3/21/02 10:38:03 AM	8	Loss-of-Signal or Loss-of-Synchronization.
3/21/02 10:24:28 AM	13	Loss-of-Signal or Loss-of-Synchronization.
3/21/02 10:22:54 AM	12	Not Operational primitive sequence (NOS) received.
3/21/02 10:19:30 AM	8	Loss-of-Signal or Loss-of-Synchronization.

Export... Clear Refresh Close

Figure 4-5 Link Incident Log

Each log entry contains:

- **Date/Time**

  The date and time of the incident.

- **Port**

  The number of the port on which the incident occurred.

- **Link Incident**

  A short description of the incident. The following events may cause a link incident to be written to the log.

  — Implicit incident.

  The attached node detects a condition that may cause problems on the link.

  — Bit-error threshold exceeded.

  The number of code violation errors has exceeded threshold.

  — Loss-of-signal or Loss-of-synchronization. This occurs if a cable is unplugged from an attached node.

Loss-of-signal occurs when a cable is unplugged from an attached node. Loss-of-synchronization condition has persisted for longer than the resource allocation time out value (R_A_TOV).

— Not-operational (NOS) primitive sequence received.

A NOS was recognized.

— Primitive sequence timeout.

- Link reset protocol timeout occurred.
- Timeout occurred for an appropriate response while in NOS receive state and after NOS is no longer recognized.

— Invalid primitive sequence received for the current link state.

Either a link reset or a link reset response primitive sequence was recognized while waiting for the offline sequence.

Threshold Alert Log

This log provides details of threshold alert notifications. Besides the date and time that the alert occurred, the log also displays details about the alert as configured through the *Configure Threshold Alert(s)* option under the *Configure* menu.

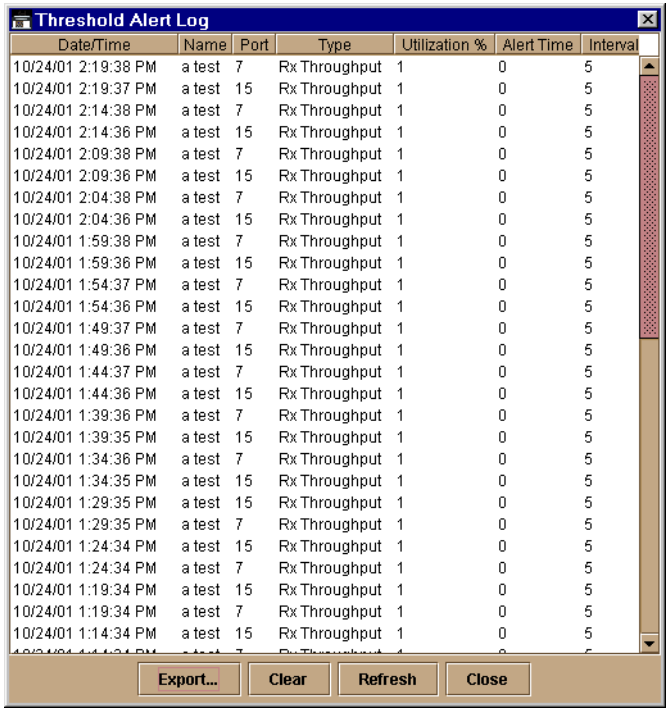

Threshold Alert Log
Date/Time Name Port Type Utilization % Alert Time Interval
10/24/01 2:19:38 PM a test 7 Rx Throughput 1 0 5
10/24/01 2:19:37 PM a test 15 Rx Throughput 1 0 5
10/24/01 2:14:38 PM a test 7 Rx Throughput 1 0 5
10/24/01 2:14:36 PM a test 15 Rx Throughput 1 0 5
10/24/01 2:09:38 PM a test 7 Rx Throughput 1 0 5
10/24/01 2:09:36 PM a test 15 Rx Throughput 1 0 5
10/24/01 2:04:38 PM a test 7 Rx Throughput 1 0 5
10/24/01 2:04:36 PM a test 15 Rx Throughput 1 0 5
10/24/01 1:59:38 PM a test 7 Rx Throughput 1 0 5
10/24/01 1:59:36 PM a test 15 Rx Throughput 1 0 5
10/24/01 1:54:37 PM a test 7 Rx Throughput 1 0 5
10/24/01 1:54:36 PM a test 15 Rx Throughput 1 0 5
10/24/01 1:49:37 PM a test 7 Rx Throughput 1 0 5
10/24/01 1:49:36 PM a test 15 Rx Throughput 1 0 5
10/24/01 1:44:37 PM a test 7 Rx Throughput 1 0 5
10/24/01 1:44:36 PM a test 15 Rx Throughput 1 0 5
10/24/01 1:39:36 PM a test 7 Rx Throughput 1 0 5
10/24/01 1:39:35 PM a test 15 Rx Throughput 1 0 5
10/24/01 1:34:36 PM a test 7 Rx Throughput 1 0 5
10/24/01 1:34:35 PM a test 15 Rx Throughput 1 0 5
10/24/01 1:29:35 PM a test 15 Rx Throughput 1 0 5
10/24/01 1:29:35 PM a test 7 Rx Throughput 1 0 5
10/24/01 1:24:34 PM a test 15 Rx Throughput 1 0 5
10/24/01 1:24:34 PM a test 7 Rx Throughput 1 0 5
10/24/01 1:19:34 PM a test 15 Rx Throughput 1 0 5
10/24/01 1:19:34 PM a test 7 Rx Throughput 1 0 5
10/24/01 1:14:34 PM a test 15 Rx Throughput 1 0 5
Export...
Clear
Refresh
Close

Figure 4-6 Threshold Alert Log

- **Date/Time**

  Date and time stamp for when the alert occurred.

- **Name**

  Name for the alert as configured through the *Configure Threshold Alerts* dialog box.

- **Port**

  Port number where the alert occurred.

- **Type**

  The type of alert: transmit (Tx) or receive (Rx).

- **Utilization %**

  Percent usage of traffic capacity. This is the percent of the port's throughput capacity achieved by the measured throughput. This setting constitutes the threshold value and is configured through the *Configure Threshold Alerts* dialog box. For example, a value of 25 means that threshold occurs when throughput reaches 25 percent of the port's capacity.

- **Alert Time**

  The maximum cumulative time that the throughput threshold percentage must exist before an alert is generated.

- **Interval**

  The time interval during which the throughput is measured and an alert can generate. This is set through the *Configure Threshold Alerts* dialog box.

Open Trunking Log

This log displays only if the optional OpenTrunking feature is installed. For details, refer to the Optional Features chapter under *Open Trunking Log* on page 6-16.

5

Using Maintenance Features

This chapter describes how to use the options that display from the *Maintenance* menu on the Product Manager menu bar.

Section	Page
Run Port Diagnostics	5-2
Collect Maintenance Data	5-2
Execute an IPL	5-2
Set Online State	5-4
Manage Firmware Versions	5-5
Enable E-Mail Notification	5-6
Enable Call-Home Notification	5-6
Backup and Restore Configuration	5-7
Reset Configuration	5-9

Run Port Diagnostics

The *Port Diagnostics* option enables you to run internal and external loopback tests on any port. To use this option, follow the detailed steps in the *McDATA Sphereon 4500 Fabric Switch Installation and Service Manual* (620-000159).

Collect Maintenance Data

The *Collect Maintenance Data* option enables you to collect maintenance data that can help support personnel diagnose system problems. Save this data to a zip file on a Zip disk (or other medium with the appropriate capacity), and forward it to technical support personnel.

NOTE: If the Full Volatility feature has been enabled through the switch's maintenance port, a memory dump file will not be included with the data collection.

To use this option, follow the detailed steps in the *McDATA Sphereon 4500 Fabric Switch Installation and Service Manual* (620-000159).

Execute an IPL

CAUTION

The Ethernet connection between the Enterprise Fabric Connectivity (EFC) Server and switch is interrupted momentarily during an initial program load (IPL). However, this does not interrupt Fibre Channel traffic.

CAUTION

An IPL is not intended for ordinary or casual use and should only be performed if the active control processor (CTP) card is suspected to be faulty. Do not use this option unless directed by your support representative or if you need to reset a failed CTP card.

If it is necessary for you to execute an IPL on the switch, use the following steps:

1. Select *IPL* from the *Maintenance* menu on the menu bar.

   A dialog box displays confirming the IPL.

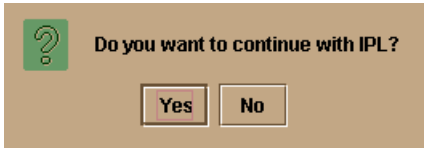


Figure 5-1 IPL Confirmation Dialog Box

2. Click *Yes*.

Selecting *IPL* from the *Maintenance* menu causes Ethernet connection between the switch and EFC Server to drop momentarily and the following to occur in the Product Manager window:

- As the network connection drops, the switch *Status* table on the *Hardware View* turns yellow.
- The *Status* field in the table displays "No Link" and the *State* field displays the reason for no link.
- A grey square displays in the status bar. Refer to Table 1-1 on page 1-33 for an explanation of this status bar display.
- The FRUs illustrated in the *Hardware View* do not display. They display again as the connection is re-established.

An IPL initiates the following functions in the switch:

- Restarts the operational firmware on the CTP card, executes abbreviated power on system tests (POSTs) and then, if no POST errors are encountered, the switch resumes the active role that it had before the IPL.
- Resets the Ethernet interface on the CTP card, causing the connection to the EFC Server to drop momentarily. The status icon for the switch in the Product View will change to a gray square until the connection is reestablished.

After the IPL:

- All Fabric services databases containing information about current Fabric logins, name server registrations, and other data remain intact, making the operation transparent to attached devices.
- The switch returns to the online state, even if it was offline before the operation.
- All ports configured as blocked will remain blocked.
- Modifications made to an active zone set configuration that have not been enabled will be automatically enabled.

Set Online State

Use the procedure in this section to display the current switch operating state (offline or online) and change the state as required. Refer to Table 1-1 on page 1-33 for more information on the switch operating states.

CAUTION

Before setting the switch offline, warn administrators and users currently operating devices that are attached to the switch that it is going offline and that there will be a disruption of communications. Make sure administrators of device(s) attached to ports halt Fibre Channel traffic through the switch.

To set the switch online or offline (depending on current state):

1. Right-click on the switch in the *Hardware View* and select *Set Online State* from the menu or select *Set Online State* from the *Maintenance* menu on the menu bar.

   One of the following dialog boxes displays, depending on the current operating state.

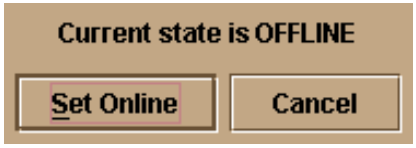


Figure 5-2 Set Online State Dialog Box (State Is Offline)

Figure 5-3 Set Online State Dialog Box (State Is Online)

2. Click *Set Offline* or *Set Online*, depending on the operating state you want to set.
3. When a warning box displays requesting you to confirm the offline or online state, click *OK*.

As the switch goes offline, "OFFLINE" displays in the *State* field of the *Switch Status* table in the *Hardware View*. LED indicators on all ports with attached devices stay green, but the switch is sending offline sequences (OLSs) to these devices.

Manage Firmware Versions

Firmware refers to the internal operating code for the switch. You can maintain up to eight firmware versions on the EFC Server for downloading to an switch. To use the *Firmware Library* option to manage firmware versions, follow the steps in the *McDATA Sphereon 4500 Fabric Switch Installation and Service Manual* (620-000159).

Enable E-Mail Notification

E-mail addresses and the simple mail transfer protocol (SMTP) server address for e-mail notification of switch events must be configured through the EFC Manager application. Refer to the *McDATA Enterprise Fabric Connectivity Manager User Manual* (620-005001) for instructions on configuring e-mail.

NOTE: E-mail recipients are configured in the EFC Manager through the *Configure E-Mail* dialog box. A valid SMTP address is configured in this dialog box.

Use the *Enable E-Mail Notification* function on the Product Manager to enable e-mail notification for events that occur on a selected switch. The default state is disabled.

To enable e-mail notification, use the following steps:

1. Select *Enable E-Mail Notification* from the *Maintenance* menu on the menu bar.
2. To enable e-mail notification, select the option to add a check mark to the check box.
3. To disable e-mail notification, select the option to remove the check mark from the check box.

Enable Call-Home Notification

NOTE: Call-Home may not be available if you are using a customer-supplied server platform for the EFC Management applications.

The call-home feature enables the EFC Server to automatically dial out to a support center to report system problems. The support center server accepts calls from the EFC Server, logs reported events, and notifies one or more support center representatives.

Configure telephone numbers and other information for the call-home feature through the Windows dial-up networking application. Refer to the *McDATA Sphereon 4500 Fabric Switch Installation and Service Manual* (620-000159) for details.

NOTE: You must enable *Call-Home Event Notification* through the EFC Manager *Maintenance* menu before enabling this function through the Product Manager for individual switches.

Use the *Enable Call Home Notification* function on the Product Manager to enable call-home notification for events that occur on the selected switch. The default state is disabled.

To enable call-home notification for system problems, use the following steps:

1. Select *Enable Call Home Notification* from the *Maintenance* menu on the menu bar to enable an disable call-home notification.

   A check mark displays next to the menu option to indicate that call-home notification is enabled.

2. Click the check box to add or remove the check mark.

Backup and Restore Configuration

Select this option from the Maintenance menu to save the product configuration stored on the switch to the EFC Server hard disk or to restore the product configuration from the EFC Server. Only a single copy of the configuration is kept on the server.

The purpose of the backup is primarily for single-CTP systems, such as the Sphereon 4500 Fabric Switch, where a backup is needed in order to restore to a replacement CTP card. You can also use this feature for a special purpose configuration or for temporary testing of a configuration. You cannot modify the location and file name of the saved configuration.

NOTE: You can only restore the configuration to a switch with the same IP address.

Backup

1. Select *Backup and Restore Configuration* from the *Maintenance* menu on the menu bar to display the *Backup and Restore Configuration* dialog box.

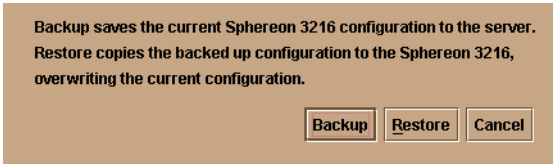

Backup saves the current Sphereon 3216 configuration to the server.
Restore copies the backed up configuration to the Sphereon 3216, overwriting the current configuration.
Backup
Restore
Cancel

Figure 5-4 Backup and Restore Dialog Box

The *Backup and Restore* dialog box consists of a short description of the features performed when you select *Backup* or *Restore*.

Following is a list of configurations that are backed up to the EFC Server:

- Identification data (switch name, description, and location).
- Port configuration data (port names, blocked states, and extended distance settings).
- Operating parameters for fabric (E_D_TOV, R_A_TOV, switch priority, interop mode) and for switch (preferred domain ID, rerouting delay, and domain RSCNs).
- SNMP configuration (trap recipients, community names, and write authorizations).
- Zoning configuration (active zone set and default zone state).

2. To backup data, click *Backup*.
3. When the dialog box appears confirming that the backup of configuration is complete, click *OK*.

   If the backup fails, a dialog box displays to inform you that the backup to the server failed.

Restore

1. Set the switch offline before performing the restore function.
2. Click *Restore* on the *Backup and Restore Configuration* dialog box to restore the backed up configuration to the nonvolatile random access memory (NV-RAM) on the switch.

   Set the switch to offline before performing the restore function. If you select *Restore* and the switch is online, a message dialog displays requesting that you turn the switch offline. No action takes place when you close the dialog box. For instructions on setting the switch offline or online, refer to *Set Online State* on page 5-4.

   If the switch is already offline and you click the *Restore* button, a confirmation dialog box displays indicating that the restore will overwrite any existing configuration already on the switch. The dialog box also displays the date of the restored backup. Click *OK*.

   Note that the restore operation initiates an IPL.
3. Set the switch back online when the restore completes.

Reset Configuration

NOTE: You must have maintenance authorization rights to access this feature.

This option resets all configuration data input through options in the *Configuration* menu, zoning configurations, and switch addressing to factory-default values. Since the current IP address for the switch may not match the factory default address, the Ethernet link between the switch and the service processor may drop and not reset. Before using this option, record the switch's current IP address which displays below the switch's icon in the EFC Manager's Product View (view *Display Options* set to *Network Address*). You can also find the current IP address through the SANpilot Interface.

After resetting the configuration, you must reset the original address on the switch through the maintenance port or the SANpilot Interface to maintain LAN connections and communication with the service processor.

Procedure

1. Set the switch offline. For instructions, refer to *Set Online State* on page 5-4.
2. Select *Reset Configuration* from the Maintenance menu on the menu bar. The following warning displays:

CAUTION

This operation will reset all switch configuration data and non-volatile settings to factory default values. All optional features will also be disabled. The switch must be offline to continue.

NOTE: If you have enabled features that add additional port function since the switch was shipped from the factory, these features will be disabled (factory default) when the configuration is reset. Only those ports that were enabled at the factory will function. You will have to enable the additional port function features again through the *Configure Feature Key* dialog box.

NOTE: If you have enabled the Full Volatility feature through the switch's maintenance port since the switch was shipped from the factory, this feature will disable (factory default) when the configuration is reset.

NOTE: Factory-default values may vary, depending on the firmware release installed in your switch. For a list of values, refer to the *McDATA Sphereon 4500 Fabric Switch Installation and Service Manual* (620-000159).

6

Optional Features

This chapter provides detailed information on using, administering, and configuring optional EFC Manager's features through EFC management application. There are two types of features covered in this chapter:

- "Keyed" features, requiring feature keys to be purchased and enabled through the *Configure Feature Key* dialog box in the product's Product Manager application.
- Features not requiring feature keys themselves, but requiring that specific keyed features be enabled before they can be accessed through EFC Manager or Product Manager applications.

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Configure Open Systems Management Server

Use these procedures to configure the open systems inband management program to function with the switch.

NOTE: The optional Open Systems Management Server feature must be enabled in order to perform this procedure.

Procedure

To configure the Open Systems Management Server, use the following steps:

1. Select *Management Server* from the *Configure* menu on the menu bar.

   The *Configure Open Systems Management Server* dialog box displays.

2. Enable the management server by clicking the *Enable Management Server* check box to add a check mark. (To disable the management server, click the check box again to remove the check mark.)

3. Click the check box in the *Host Control Prohibited* field to display a check mark and prohibit a host management program from changing configuration and connectivity parameters on the switch. In this case, the host program has read-only access to configuration and connectivity parameters. Clicking the check box when it contains a check mark removes the check mark and allows a host program to change configuration and connectivity parameters on the switch.

4. Activate changes and close the dialog box by clicking *Activate*.

5. If you are finished configuring the switch, you can back up the configuration data. For more information, refer to *Backup and Restore Configuration* on page 5-7.

SANtegrity Features

SANtegrity Binding includes a set of features that enhance security in SANs (Storage Area Networks) that contain a large and mixed group of fabrics and attached devices. Through these features you can allow or prohibit switch attachment to fabrics and device attachment to switches. These features are enabled by purchasing a feature key, then enabling the key through the *Configure Feature Key* dialog box. For general instructions in enabling a feature key, refer to *Configure Feature Key* on page 3-17.

SANtegrity Binding features include:

- Fabric Binding
- Switch Binding

Enterprise Fabric Mode - Although this is not a keyed feature the SANtegrity Fabric Binding and Switch Binding must be installed before you can use Enterprise Fabric Mode function through the EFC Manager *Fabrics* menu.

Fabric Binding

This feature is managed through the Fabric Binding option, available through the *Fabrics* menu in the EFC Manager when the *Fabrics* tab is selected. Using Fabric Binding, you can allow specific switches to attach to specific fabrics in the SAN. This provides security from accidental fabric merges and potential fabric disruption when fabrics become segmented because they cannot merge.

Enable/Disable and Online State Functions

In order for Fabric Binding to function, specific operating parameters and optional features must be enabled. Also, there are specific requirements for disabling these parameters and features when the director or switch is offline or online. Be aware of the following:

- Because switches are bound to a fabric by world wide name (WWN) and domain ID, the Insistent Domain ID option in the *Configure Switch Parameters* dialog box is automatically enabled if Fabric Binding is enabled. You cannot disable Insistent Domain ID while Fabric Binding is active and the switch is online.
- If Fabric Binding is enabled and the switch is online, you cannot disable Insistent Domain ID.
- If Fabric Binding is enabled and the director or switch is offline, you can disable Insistent Domain ID, but this will disable Fabric Binding.

- You cannot disable Fabric Binding or Switch Binding if Enterprise Fabric Mode is enabled. However, if Enterprise Fabric Mode is disabled, you can disable Fabric Binding, Switch Binding, or both.

For More Information

To enable, disable, and configure this option, refer to the Fabric Binding section of Chapter 8, "Optional Features," in the *McDATA Enterprise Fabric Manager User Manual* (620-005001-600).

Switch Binding

This feature is managed through the Switch Binding submenu options available on the Product Manager *Configure* menu. Using *Switch Binding*, you can specify WWNs for devices and switches that can attach to director and switch ports. When an unauthorized WWN attempts to log in, an event is posted to the event log. This provides security in environments that include a large number of devices by ensuring that only the intended set of devices attach to a switch or director.

Configuring Switch Binding - Overview

To configure switch binding, you must first activate the feature using the *Switch Binding State Change* dialog box while selecting the type of port where you want to restrict connection (connection policy). Possible selections are E_Ports, F_Ports, or all types.

If the switch is online, activating switch binding populates the Membership List in the *Switch Binding - Membership List* dialog box (Product Manager) with the following WWNs currently connected to the switch, depending on the connection policy set in the *State Change* dialog box:

- WWNs of devices connected to F_Ports (F_Port connection policy). The WWN is the WWN of the attached device's port.
- WWNs of switches connected to E_Ports (E_Port connection policy). The WWN is the WWN of the attached switch.
- WWNs of devices connected to F_Ports and switches connected to E_Ports (all-ports connection policy).

Notes

- When the Switch Binding feature is first installed and has not been enabled, the Switch Membership List is empty. When you enable Switch Binding, the Membership List is populated with WWNs of devices, switches, or both that are currently connected to the switch.

- If the switch is offline and you activate switch binding, the Membership List is not automatically populated.
- Edits to the Switch Binding Membership List will be maintained when you enable or disable Switch Binding.

After enabling Switch Binding, you prohibit devices and/or switches from connecting with switch ports by removing them from the Membership List in the *Switch Binding Membership List* dialog box. You allow connections by adding them to the Membership List. You can also add detached nodes and switches as well.

Enable/Disable Switch Binding

1. Select the *State Change* option from the *Configure* menu's *Switch Binding* submenu. The *Switch Binding State Change* dialog box displays.

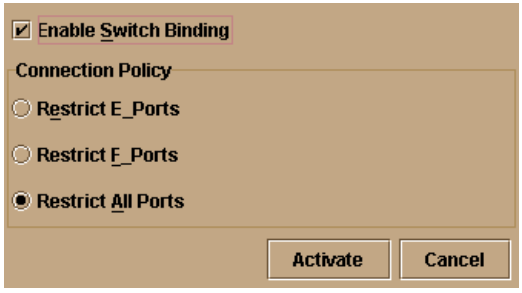

Figure 6-1 Switch Binding State Change Dialog Box

2. Perform one of the following steps:
   - To disable Switch Binding (a check mark appears in the *Enable Switch Binding* check box), click the *Enable Switch Binding* check box to remove the check mark, then click *Activate*.
   - To enable Switch Binding (check mark is not in the *Enable Switch Binding* check box), click the *Enable Switch Binding* check box to add a check mark. Go on to step 3 to set the Connection Policy.
3. Click one of the *Connection Policy* radio buttons.

- *Restrict E_Ports*. Select if you want to restrict connections from specific switches to switch E_Ports. Switch WWNs can be added to the Switch Membership List to allow connection and removed from the Membership List to prohibit connection. Devices are allowed to connect to any F_Port.
- *Restrict F_Ports*. Select if you want to restrict connections from specific devices to switch F_Ports. Device WWNs can be added to the Switch Membership List to allow connection and removed from the Membership List to prohibit connection. Switches are allowed to connect to any E_Port.
- *Restrict All*. Select if you want to restrict connections from specific devices to switch F_Ports and switches to switch E_Ports. Device and switch WWNs can be added to the Switch Membership List to allow connection and removed from the Membership List to prohibit connection.

4. Click *Activate* to enable the changes and close the dialog box.
5. Edit the Switch Membership List through the *Switch Binding Membership List* dialog box to add or remove switches and devices that are allowed to connect with the switch. Refer to *Editing the Switch Membership List* following for procedures.

Editing the Switch Membership List

1. Select the *Edit Membership List* option from the *Configure* menu's *Switch Binding* submenu in the Product Manager. The *Switch Binding Membership List* dialog box displays. The WWNs of devices and/or switches that can currently connect to switch ports are listed in the *Switch Membership List* panel.

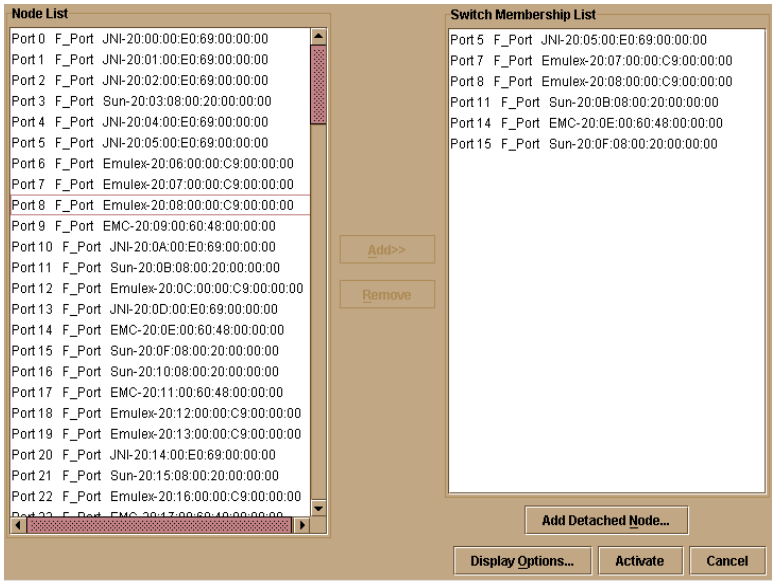

Figure 6-2 Switch Binding Membership List Dialog Box

NOTE: Refer to *Configuring Switch Binding - Overview* on page 6-4 for information on how the Switch Membership List is populated with WWNs according to options set in the *Switch Binding State Change* dialog box.

---

2. If nicknames are configured for WWNs through the EFC Manager and you want these to display instead of WWNs in this dialog box, click the *Display Options* button at the bottom of the dialog box. When the *Display Options* dialog box displays, click *Nickname*, then *OK*.
3. To prohibit connection to a switch port from a WWN currently in the Membership List, click the WWN or nickname in the Membership List, then click the *Remove* button. The WWN or nickname will move to the *Node List* panel. WWNs can only be removed from the fabric if any of the following is true:
   - The switch is offline.
   - Switch Binding is disabled.
   - The switch or device with the WWN is not connected to the switch.

- Switch Binding is not enabled for the same port type as enabled for the Connection Policy in the *Switch Binding State Change* dialog box. For example, a WWN for a switch attached to an E_Port can be removed if the Switch Binding Connection Policy was enabled to Restrict F_Ports.
- The switch or device with the WWN is connected to a port that is blocked.
- The switch or device with the WWN is not currently connected to the switch (detached node).

4. WWNs can be added to the *Switch Membership List* (and thereby allowed connection) when Switch Binding is either enabled or disabled. To allow connection to a switch port from a WWN in the *Node List* Panel, select the WWN or nickname in the *Node List* panel, click the *Add* button. The WWN or nickname will move to the *Membership List* panel.
5. To add a WWN for a device or switch not currently connected to the switch, click the *Detached Node* button. When the *Add Detached Node* dialog box appears, enter the appropriate WWN or nickname (if configured through the EFC Manager) and click *OK*. The WWN or nickname appears in the *Switch Membership List*.
6. Click *Activate* to enable the changes and close the dialog box.

Enable/Disable and Online State Functions

In order for Switch Binding to function, specific operating parameters and optional features must be enabled. Also, there are specific requirements for disabling these parameters and features when the director or switch is offline or online. Be aware of the following:

- Switch Binding can be enabled or disabled whether the switch is offline or online.
- Enabling Enterprise Fabric Mode automatically enables Switch Binding.
- You cannot disable Switch Binding if Enterprise Fabric Mode is enabled.
- If Enterprise Fabric Mode is enabled and the director or switch is online, you cannot disable Switch Binding. However, if Enterprise Fabric Mode is disabled, you can disable Fabric Binding, Switch Binding, or both.

- If Enterprise Fabric Mode is enabled and the director or switch is offline you can disable Switch Binding, but Enterprise Fabric Mode will also disable.
- WWNs can be added to the Switch Membership List when Switch Binding is enabled or disabled.
- WWNs can only be removed from the Switch Membership List if any of the following are true:
  - The switch is offline.
  - Switch Binding is disabled.
  - The switch or device with the WWN is not connected to the switch.
  - Switch Binding is not enabled for the same port type as enabled for the Connection Policy in the *Switch Binding State Change* dialog box. For example, a WWN for a switch attached to an E_Port can be removed if Switch Binding Connection Policy was enabled to Restrict F_Ports.
  - The switch or device with the WWN is connected to a port that is blocked.
  - The switch or device with the WWN is not currently connected to the director or switch (detached node).
- If the director or switch is online and Switch Binding is not enabled, all nodes and switches attached to the switch are automatically added to the Switch Membership List.

Zoning with Switch Binding Enabled

Note that SANtegrity Binding has no effect on existing zoning configurations. However, note that if a device WWN is in a specific zone, but the WWN is not in the Switch Membership List, the device cannot log in to the director or switch port and cannot connect to other devices in the zone with Switch Binding enabled.

Enterprise Fabric Mode

Enterprise Fabric Mode is an option available on the *Fabrics* menu in the EFC Manager application if the SANtegrity Binding feature key is installed. This option automatically enables the following features and operating parameters that are necessary in multiswitch Enterprise Fabric environments. Note that there are specific requirements for disabling these parameters and features when the director or switch is offline or online.

Features and Parameters Enabled

Fabric Binding

This is a SANtegrity Binding feature enabled through the *Fabrics* menu in the EFC Manager that allows or prohibits switches and directors from merging with a selected fabric. Refer to *Enable/Disable and Online State Functions* on page 6-3 for details on enabling/disabling Fabric Binding with Enterprise Fabric Mode enabled.

Switch Binding

This is a SANtegrity Binding feature enabled through the *Configure* menu in the Product Manager that allows or prohibits switches and/or directors from connecting to switch E_Ports, devices from connecting to F_Ports. Refer to *Enable/Disable and Online State Functions* on page 6-8 for details on enabling/disabling Switch Binding with Enterprise Fabric Mode enabled.

Rerouting Delay

Rerouting delay is a parameter in the *Configure Switch Parameters* dialog box, available from *Configure* menu in the Product Manager application.

Rerouting Delay ensures that frames are delivered through the fabric in order to their destination. If there is a change to the fabric topology that creates a new path (for example, a new switch is added to the fabric), frames may be routed over this new path if its hop count is less than a previous path with a minimum hop count. This may result in frames being delivered to a destination out of order since frames sent over the new, shorter path may arrive ahead of older frames still in route over the older path. If Rerouting Delay is enabled, traffic ceases in the fabric for the time specified in the E_D_TOV field of the Configure Fabric Parameters dialog box (Configure menu). This delay enables frames sent on the old path to exit to their destination before new frames begin traversing the new path.

If Enterprise Fabric Mode is enabled, this option is automatically enabled and cannot be disabled unless the switch is offline. In this case, disabling Rerouting Delay also disables Enterprise Fabric Mode.

Domain RSCNs

This is a parameter in the Configure Switch Parameters dialog box, available from Configure Menu in the Product Manager application. Domain register for state change notifications (domain RSCNs) are sent between end devices in a fabric to provide additional connection information to host bus adapters (HBA) and storage devices. As an example, this information might be that a logical path has been broken because of a physical event, such as a fiber optic cable being disconnected from a port.

If Enterprise Fabric Mode is enabled, this parameter is automatically enabled and cannot be disabled unless the switch is offline. In this case, disabling Domain RSCNs also disables Enterprise Fabric Mode.

Insistent Domain Identification (ID)

This is a parameter in the *Configure Switch Parameters* dialog box, available from *Configure* menu in the Product Manager application. Enabling this option sets the domain ID configured in the *Preferred Domain ID* field in the *Configure Switch Parameters* dialog box as the active domain identification when the fabric initializes. A static and unique domain identification is required by the Fabric Binding feature because the feature's Fabric Membership list identifies switches by WWN and Domain ID. If a duplicate preferred domain ID is used, then insisted, warnings occur when directors and switches are added to a Fabric Membership List.

If Fabric Binding or Enterprise Fabric Mode is enabled, this option is automatically enabled and cannot be disabled unless these options are disabled when the switch is offline. If the switch is online, disabling Insistent Domain ID will disable Enterprise Fabric Mode and Fabric Binding.

For More Information

Also refer to *Enable/Disable and Online State Functions* on page 6-3 for Fabric Binding and *Enable/Disable and Online State Functions* on page 6-8 for Switch Binding.

To enable and disable this option, refer to the Enterprise Fabric section of Chapter 8, "Optional Features," in the *McDATA Enterprise Fabric Manager User Manual* (620-005001-600).

OpenTrunking

Interswitch links (ISLs) connect ports between E_Ports on Fibre Channel switches and link these switches into a multiswitch fabric. Multiple ISLs may be connected between the switches in the fabric. Data from an attached end device (server or storage) flows through these ISLs to a target end-device connected to a switch somewhere in the fabric. A data flow is data received from a specified receive port that is destined for a port in a specified target domain (switch). The list of ISLs that are candidates for being rerouted (to or from) is derived from the fibre shortest path first (FSPF) algorithm.

The OpenTrunking feature monitors the average data rates of all traffic flows on ISLs (from a receive port to a target domain), and periodically adjusts routing tables to reroute data flows from congested links to lightly loaded links and optimize bandwidth use. The objective of open trunking is to make the most efficient possible use of redundant ISLs between neighboring switches, even if these ISLs have different bandwidths.

Load-balancing among the ISLs does not require user configuration, other than enabling OpenTrunking. However, you can modify default settings for congestion thresholds (per port) and the Low BB_Credit Threshold if desired.

In particular, you do not need to manually configure ISLs into "trunk groups" of redundant links where data can be "off-loaded." Candidate links for rerouting flow are identified and maintained automatically. This means that flow may be rerouted onto a link that goes to a different adjacent switch, as long as that link is on the least cost/shortest path to the destination domain ID.

To install and enable this option, select the *Configure Feature Key* option under the Product Manager's *Configure* menu. Refer to *Configure Feature Key* on page 3-17.

Enabling and Configuring Open Trunking

To enable OpenTrunking for a specific switch and configure threshold values and event notification options, use the following steps.

1. Select *Open Trunking* from the *Configure* menu on the menu bar.

   The Configure Open Trunking dialog box displays.

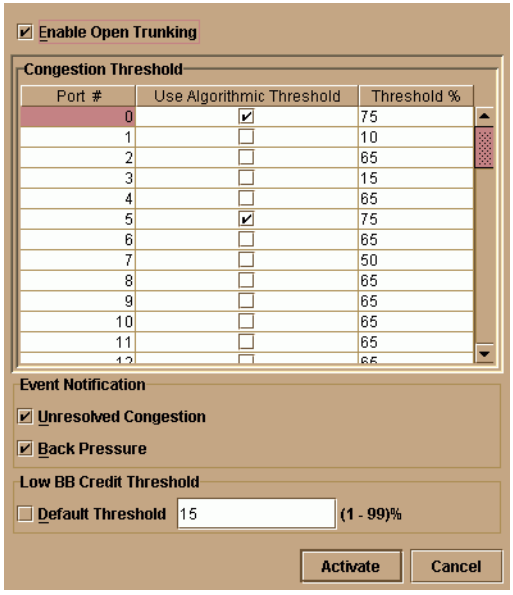

Figure 6-3 Configure Open Trunking Dialog Box

2. Enable Open Trunking by clicking the *Enable Open Trunking* check box to display a check mark.
3. Set the *Congestion Thresholds* for ports as percentages of link bandwidths, in the range of 1% through 99%. These thresholds are used only when a port becomes an ISL. When the link's traffic load becomes greater than this percentage, the link is seen as "congested" and traffic is rerouted (if possible) to an uncongested link. Note that rerouting may not be possible if there are no alternate links available or if alternate links are congested or lack BB_Credits.

   NOTE: Using default settings for port congestion thresholds should work well in most cases. This step is not required.

Set the *Congestion Threshold* using one of these methods:

- Click the check box under the *Use Algorithmic Threshold* column to display a value under the *Threshold %* column. This value is computed by the feature's rerouting algorithm. If you click this check box, you cannot enter a value into the *Threshold %* column for the port.

  If you click the check box to remove the check, any value that was set in the *Threshold %* column for the port will redisplay.

- Click in the *Threshold %* column and enter a value in the range of 1 through 99.

NOTE: You must either specify a value in the *Threshold %* column or select the *Use Algorithmic Threshold* checkbox.

4. Set *Event Notification* options. Note that, if enabled, these notifications occur the first time the events occur. Notifications are not resent while the problem persists.

   - *Unresolved Congestion*. Click this check box to display a check and enable notification. If enabled, an "unresolved congestion" entry is made to the Event Log and an SNMP trap will be generated, if trap recipients are configured through the *Configure SNMP* dialog box.

     An unresolved congestion event occurs when the rerouting algorithm cannot find a path for rerouting data flow and relieving congestion on an ISL.

   - *Back Pressure.* Click this check box to display a check and enable this option. If enabled, a back pressure entry will be made to the *Event Log* and an SNMP trap will be generated if trap recipients are configured through the *Configure SNMP* dialog box.

     A back pressure event occurs when the percentage of time the ISL lacks BB_Credits exceeds the threshold. A separate event also occurs when the backpressure condition ends.

5. Set the *Low BB Credit Threshold*.

NOTE: Earlier versions of this dialog box may display *Credit Starvation Threshold* instead of *Low BB Credit Threshold*.

NOTE: Using default settings for this threshold should work well in most cases. This step is not required.

This is the percentage of time that the transmitting link cannot transmit because BB_Credit is unavailable. It is the percent of time that the link can be treated as "back-pressured" by the rerouting algorithm. This value is also used when determining routes for a transmit link. A back-pressured ISL cannot be the recipient of traffic rerouted from other ISLs, and traffic on a back-pressured ISL may be rerouted even if the ISL is not congested.

- Click *Default Threshold* and a default value (1 to 99%) will appear in the threshold field. If the default is enabled, you cannot enter values into the field.
- Click in the threshold field and enter a value from 1 to 99.

6. Click *Activate* to enable these values on the switch and close the dialog box.

Pop-Up Menu

Right click on columns in the *Configuration Threshold* table to display menu options that globally change values in the column cells.

Use Algorithmic Threshold

Right click in the column to display these options:

- *Set all to Default* - Adds checks to all check boxes in this column and sets all cells of *Threshold %* column to default values.
- *Clear All* - Clears all check boxes in this column and restores values in cells of *Threshold %* column with previous values.

Threshold %

Right click in the column to display these options:

- *Set All To xx* - Sets all cells in this column to the value (xx) that you clicked.
- *Restore All* - Sets all cells in the column to the previous values.

Open Trunking Log

This log (Figure 6-4) provides details on flow rerouting that is occurring through switch ports.

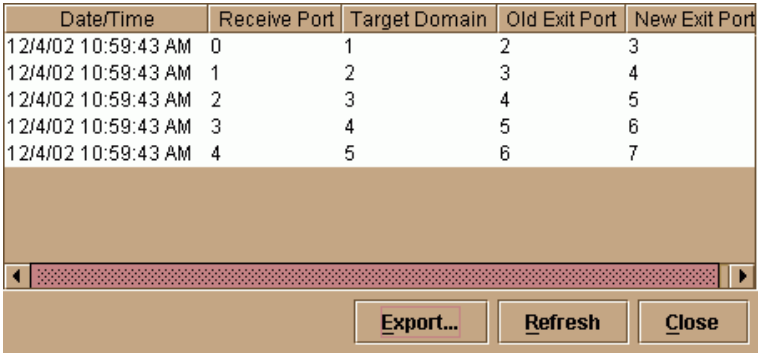

Figure 6-4 Open Trunking Log

- *Date and Time* - Date and Time that action occurred.
- *Receive Port* - The decimal receive port number on the local switch associated with the flow that was rerouted.
- *Target Domain* - The decimal domain ID associated with the flow that was rerouted.
- *Old Exit Port* - The decimal exit port number on this switch that the flow used to get to the target domain.
- *New Exit Port* - The decimal exit port number on this switch that the flow now uses to get to the target domain.

Flexport

Sphereon 3216, Sphereon 3232, and Sphereon 4500 Switches can be purchased at a discount without all Fibre Channel ports enabled. The optional Flexport feature is a hardware port expansion kit that allows customers to upgrade switch capacity on demand in eight-port increments. Flexport kits are available to upgrade the:

- Sphereon 3216 Switch from eight to 16 ports.
- Sphereon 3232 Switch from 16 to 24 ports, or from 24 to 32 ports.
- Sphereon 4500 Switch from eight to 16 ports, or from 16 to 24 ports.

Each port expansion kit includes eight SFP optical transceivers and upgrade instructions.

To enable the added port capacity through the Product Manager application, a feature key must be purchased and installed through the *Configure Feature Key* dialog box. There are no other configuration options in the EFC Manager or Product Manager for this feature.

For complete instructions on installing Flexport hardware and upgrading your switch, refer to the product Installation and Service Manual or instructions that shipped with your upgrade kit.

A

Product Manager Messages

This appendix lists and explains messages that may display in message boxes as you use the Product Manager. Solutions to problems implied by each message are included when applicable.

A

Message **Activating this configuration will overwrite the current configuration.**

Description Confirmation to activate a new address configuration.

Action Click *Yes* to confirm activating the new address configuration or *No* to cancel the operation.

Message **All configuration names must be unique.**

Description All address configurations must be saved with unique names.

Action Save the configuration with a different name that is unique to all saved configurations.

Message **All FPM ports will be held inactive while the director is configured to 2Gb/sec speed. Do you want to continue?**

Description Intrepid 6064 director only. Occurs when FPM cards are installed in the director and switch speed to set to 2Gb/sec in the *Configure Switch Parameters* dialog box.

Action Replace FPM cards with UPM cards (cards operate at 1 and 2 Gb/sec) or set the switch speed to 1 Gb/sec.

Message **All port names must be unique.**

Description A duplicate port name was entered. Every configured port name must be unique.

Action Reconfigure the port with a unique name.

Message **Another Product Manager is currently performing a firmware install.**

Description Only one firmware install to a specific director can take place at a time.

Action Wait for the current firmware install to complete and try again.

Message **Are you sure you want to delete firmware version?**

Description Requesting confirmation to delete the firmware version. Firmware library can hold only eight firmware versions.

Action Click *Yes* to confirm the firmware deletion or *No* to cancel the operation.

Message **Are you sure you want to delete this address configuration?**

Description Confirmation to delete the selected address configuration.

Action Click *Yes* to confirm the deletion of the address configuration or *No* to cancel the operation.

Message **Are you sure you want to send firmware version?**

Description Confirmation to send a firmware version to the switch.

Action Click *Yes* to confirm sending the firmware version to the switch, or no to cancel the operation.

C

Message **Cannot change Port Type while Management Style is FICON without SANtegrity feature. Please contact your sales representative.**

Description Firmware level is 6.0 or less, and user attempted to change a port type in the Configure Ports dialog box while FICON management style is enabled, but the optional SANtegrity Binding feature is not installed.

Action Informational message. If firmware level is at 6.0 or below, install SANtegrity Binding before changing port types in the Configure Ports dialog box while using FICON management style.

Message **Cannot disable Switch Binding while Enterprise Fabric Mode is active and the switch is Online.**

Description User attempted to disable switch binding through the Switch Binding Change State dialog box, but Enterprise Fabric Mode is enabled.

Action You must either disable Enterprise Fabric Mode using the Enterprise Fabric Mode dialog box in the EFC Manager application or set the switch offline before you can disable Switch Binding.

Message **Cannot disable Insistent Domain ID while Fabric Binding is active.**

Description User attempted to disable the Insistent Domain ID parameter through the Configure Switch Parameters dialog box, but Fabric Binding is enabled.

Action Disable Fabric Binding through the Fabric Binding dialog box before disabling these parameters.

Message **Cannot enable beaconing on a failed FRU.**

Description Occurs when selecting Enable Beaconing option for a failed FRU.

Action Replace FRU and enable beaconing again or enable beaconing on operating FRU.

Message **Cannot enable beaconing while the system error light is on.**

Description Beaconing cannot be enabled while the system error light is on.

Action Select *Clear System Error Light* from *Product* menu to clear error light, then enable beaconing.

Message **Cannot enable OpenTrunking while Enterprise Fabric Mode is active and the switch is offline.**

Description Enterprise Fabric mode is active and the switch or director is online and user is attempting to enable OpenTrunking. This message only displays if the optional OpenTrunking feature is installed.

Action Perform either of the following steps:

- Disable *Enterprise Fabric Mode* option by selecting the appropriate fabric in the Fabric Tree portion of the EFC Manager window (*Fabrics* tab) and then selecting *Enterprise Fabric Mode* from the *Fabrics* menu. When the *Enterprise Fabric Mode* dialog box displays, click *Start* and follow prompts to disable the feature.
- Set the switch or director offline through the *Set Online State* dialog box. Display this dialog box by selecting *Set Online State* from the Product Manager *Maintenance* menu.

Message **Cannot have E_Ports if Management Style is FICON unless SANtegrity feature is installed. Please contact your sales representative.**

Description Firmware level is at 6.0 or below and user attempted to change the management style from Open Systems to FICON with E_Ports ports configured, but SANtegrity Binding is not installed.

Action Informational message. At firmware level 6.0 and below, if you install SANtegrity Binding before changing to FICON management style, then E_Ports will remain as E_Ports when you change to FICON management style. If SANtegrity Binding is not installed, setting a director to FICON management style will change all E_ports to G_Ports.

Message **Cannot have spaces in field.**

Description Spaces are not allowed in this field.

Action Remove the spaces or retype the field without spaces.

Message **Cannot install firmware to a director with a failed CTP card.**

Description Firmware cannot be installed on a director with a defective CTP card.

Action Replace the failed CTP card and retry the firmware install to the director.

Message **Cannot modify director/switch speed. Port speeds cannot be configured at a higher data rate than the director/switch speed.**

Description Port speeds cannot be configured at a higher data rate than the director speed. This displays when you set the director speed to 1 Gb/sec through the *Configure Switch Parameters* dialog box (Intrepid 6064 model only) and at least one of the ports is running at 2 Gb/sec.

Action Either return the director speed to 2 Gb/sec or configure all port data speeds to 1 Gb/sec through the *Configure Ports* dialog box.

Message **Cannot perform this operation while the director is offline.**

Description This operation cannot take place while the director is offline.

Action Configure the director offline through the *Set Online State* dialog box then retry the operation.

Message **Cannot retrieve current SNMP configuration.**

Description The current SNMP configuration cannot be retrieved. The link is down or busy.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **Cannot retrieve diagnostics results.**

Description Diagnostics results cannot be retrieved. The link is down or busy.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **Cannot retrieve director date and time.**

Description Director date and time cannot be retrieved. The link is down or busy.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **Cannot retrieve director state.**

Description Director state cannot be retrieved. The link is down or busy.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **Cannot retrieve information for port.**

Description Information for the port cannot be retrieved. The link is down or busy.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **Cannot retrieve port configuration.**

Description Port configuration cannot be retrieved. The link is down or busy.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **Cannot retrieve port information.**

Description Port information cannot be retrieved. The link is down or busy.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **Cannot retrieve port statistics.**

Description Port statistics cannot be retrieved. The link is down or busy.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **Cannot run diagnostics on a port that is failed.**

Description Port diagnostics cannot be performed on a port that has failed.

Action Run diagnostics only on an operational port.

Message **Cannot run diagnostics on an active E-port.**

Description Port diagnostics cannot be performed on an active E-port.

Action Run diagnostics on an E-port only when it is not active.

Message **Cannot run diagnostics while a device is logged-in to the port.**

Description A device is logged in to the port where a diagnostic test is attempted.

Action Log out the device and run the diagnostic test again.

Message **Cannot run diagnostics. The port card is not installed.**

Description Port diagnostics cannot be performed when the port card is not installed.

Action Run diagnostics only on a port that is installed.

Message **Cannot save IPL configuration file while active=saved is enabled.**

Description The user cannot save the IPL file while the active=save property is set.

Action The FICON management server property, active=save, must be disabled for EFCM to save the IPL file.

Message **Cannot save port configuration.**

Description Port configuration cannot be saved. The link is down or busy.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **Cannot save SNMP configuration.**

Description SNMP configuration cannot be saved. The link is down or busy.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **Cannot set all ports to 1 Gb/sec due to port speed restriction on some ports.**

Description Displays if you try to set ports to operate at 1 Gb/sec data speed through the *Configure Ports* dialog box and some ports do not support speed configuration.

Action Replace ports that do not support speed configuration with those that do support more than one speed configuration.

Message **Cannot set all ports to 2Gb/sec due to port speed restriction on some ports.**

Description Displays if you try to set ports to operate at 2 Gb/sec data speed through the *Configure Ports* dialog box and some ports do not support speed configuration.

Action Replace ports that do not support speed configuration with those that do support more than one speed configuration.

Message **Cannot set all ports to Negotiate due to port speed restriction on some ports.**

Description Displays if you try to set all ports to Negotiate through the *Configure Ports* dialog box and some ports do not support speed configuration.

Action Replace ports that do not support speed configuration with those that do support more than one speed configuration.

Message **Cannot set director state.**

Description Director state cannot be set. The link is down or busy.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **Cannot set Fibre Channel parameters.**

Description Fibre Channel parameters cannot be set. The link is down or busy.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **Cannot set switch date and time.**

Description Switch date and time cannot be set. The link is down or busy.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **Cannot set switch state.**

Description Switch state cannot be set. The link is down or busy.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **Cannot set write authorization without defining a community name.**

Description A community name was not defined in the *Configure SNMP* dialog box for the write authorization selected.

Action Provide a name in the name field where write authorization is checked.

Message **Cannot start data collection.**

Description Data collection cannot be started. The link is down or busy.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **Cannot start firmware install while CTP synchronization is in progress.**

Description CTP synchronization is in progress while you are attempting to install firmware.

Action Wait for the CTP synchronization to complete before starting the firmware install.

Message **Cannot start port diagnostics.**

Description Port diagnostics cannot be started. The link is down or busy.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **Cannot swap an uninstalled port.**

Description A port swap cannot be performed when the port card is not installed.

Action Perform a swap only on a port that is installed.

Message **Click *OK* to remove all contents from log.**

Description Requesting confirmation that you want all contents removed from the log.

Action Click *OK* to continue or *Cancel* to cancel the operation.

Message **Continuing may overwrite host programming. Continue?**

Description Configurations sent from the host may be overwritten by EFCM.

Action Continuing will activate the current configuration, which may have been configured by a FICON host.

Message **Could not export log to file.**

Description A file I/O error occurred. The log file could not be saved to the specified destination.

Action Ensure filename and drive are correct.

Message **Could not find firmware file.**

Description Firmware file selected was not found in the FTP directory.

Action Ensure file name and directory are correct.

Message **Could not find firmware file.**

Description The selected file is not a firmware file.

Action Obtain a valid firmware file from your service representative.

Message **Could not remove dump files from server.**

Description Dump files could not be removed from server. Link may be down or director may be busy.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **Could not stop port diagnostics.**

Description Port diagnostics could not be stopped. Link may be down or director may be busy.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **Could not write firmware to flash.**

Description Firmware could not be written to flash memory.

Action Try again. If problem persists, contact support personnel.

Message **CUP name and port name are identical.**

Description Within the address configuration, one or more of the port names are the same as the CUP name.

Action Make sure all names are unique for the ports and CUP name.

D

Message **Date entered is invalid.**

Description Date entered incorrectly.

Action Verify that the number of days in the month is valid.

Message **Device applications should be terminated before starting diagnostics. Press *Next* to continue.**

Description Device application is not terminated.

Action Terminate device application before running port diagnostics.

Message **[device WWN] cannot be removed from the Switch Membership List while participating in Switch Binding. The device must be isolated from the switch, or Switch Binding deactivated before it can be removed.**

Description User attempted to remove a device WWN from the Switch Membership List (SANtegrity feature) while Switch Binding is enabled.

Action Remove the device from the switch by blocking the port, setting the director offline, or disabling Switch Binding through the *Switch Binding Change State* dialog box before removing devices form the Switch Membership List.

Message **Director clock alert mode must be cleared before enabling period synchronization.**

Description Clock alert mode is enabled through the *Configure FICON Management Server* dialog box and user is attempting to enable *Periodic Date/Time Synchronization* through the *Configure Date and Time* dialog box.

Action Disable clock alert mode through the *Configure FICON Management Server* dialog box.

Message **Disabling Insistent Domain ID will disable Fabric Binding. Do you want to continue?**

Description Fabric Binding is enabled through the EFC Manager and user attempted to disable Insistent Domain ID in the *Configure Switch Parameters* dialog box.

Action Click *Yes* if you want to continue and disable Fabric Binding.

Message **Disabling Switch Binding will disable Enterprise Fabric Mode. Do you want to continue?**

Description User attempting to disable Switch Binding through the Switch Binding State Change dialog box, but Enterprise Fabric Mode is enabled

Action Disable Enterprise Fabric Mode using the Enterprise Fabric Mode dialog box in the EFC Manager before disabling Switch Binding.

Message **Do you want to continue with IPL?**

Description Requesting confirmation to proceed with an IPL.

Action Click *Yes* to confirm the IPL or *Cancel* to cancel the operation.

Message **Duplicate community names require identical write authorizations.**

Description Duplicate community names exist that have conflicting or different write authorizations.

Action Verify community names and whether a community name is duplicated with different write authorizations.

E

Message **Enterprise Fabric Mode will be disabled if any of the following parameters are disabled: Insistent Domain ID, Rerouting Delay, Domain RSCN's. Do you want to continue?**

Description User attempted to disable these parameters in the *Configure Switch Parameters* dialog box while the director was online, but Enterprise Fabric Mode (SANtegrity feature) is enabled.

Action Click *Yes* if you want to continue, and disable Enterprise Fabric Mode.

Message **Error retrieving port information.**

Description An error occurred while retrieving port information. The link is down or busy.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **Error retrieving port statistics.**

Description An error occurred while retrieving port statistics. The link is down or busy.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **Error stopping port diagnostics.**

Description An error occurred while attempting to stop the port diagnostics from running. The link is down or busy.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **Error transferring files <message>.**

Description An error occurred while attempting to download files.

Action Retry the operation. If the condition persists, contact support personnel.

F

Message **Field cannot be blank.**

Description A blank field is not allowed in this dialog.

Action Enter the required information in the blank field.

Message **Feature not supported. The 'product name' must be running version 05.00.00 or higher.**

Description The enterprise operating system (E/OS) version on the hardware product (switch or director) is lower than 05.00.00. This message only displays if the optional OpenTrunking feature is installed.

Action Install E/OS version 5.00.00 or higher on the hardware product.

Message **File transfer aborted.**

Description User has stopped the file transfer.

Action N/A. An informational message.

Message **Field has exceeded maximum number of characters.**

Description The maximum number of data entry characters allowed in the field was exceeded.

Action Enter the information using the prescribed number of characters.

Message **File transfer is in progress.**

Description Firmware or data collection is being transferred.

Action N/A. An informational message.

Message **Firmware download timed out.**

Description The director did not respond in the time allowed. The status of the firmware install operation is unknown.

Action Retry the operation. If the problem persists, contact support personnel.

Message **Firmware file I/O error.**

Description Firmware file input/output error occurred.

Action Contact support personnel.

Message **Firmware file not found.**

Description Firmware file deleted from the EFC Server.

Action Add firmware to library.

I

Message **Incorrect product type.**

Description When configuring a new product through the *New Product* dialog box, an incorrect product was selected for the network address.

Action Select the correct product type for the product with the network address.

Message **Installing this feature key, while online, will cause an IPL operation on the switch and a momentary loss of LAN connection. This operation is non-disruptive to the Fibre Channel traffic. Do you wish to continue installing this feature key?**

Description If the director is online, installing the new feature key will cause an internal program load (IPL). The LAN connection to the EFC server will be lost momentarily, but Fibre Channel traffic will not be affected.

Action Select Yes to install the feature key or *No* to not install.

Message **Internal file transfer error received from director.**

Description Director detected an internal file transfer error.

Action Contact support personnel.

Message **Invalid character in field.**

Description Invalid character in the input field.

Action Re-enter the field information.

Message **Invalid configuration name.**

Description Attempted to save an address configuration name with an invalid name.

Action Use up to 24 alphanumeric characters, including spaces, hyphens and underscores.

Message **Invalid feature key.**

Description The feature key was not recognized.

Action Re-enter the feature key noting the key is case sensitive and to include the dashes.

Message **Invalid firmware file.**

Description Selected file is not a firmware file.

Action Select the correct firmware file.

Message **Invalid network address.**

Description Network address specified is not known by the domain name server.

Action Check the input address and specify the correct network address.

Message **Invalid port address.**

Description Invalid port address has been entered.

Action Verify port address through the *Configure Addresses - "Active"* dialog box (FICON management style only) and re-enter.

Message **Invalid port number.**

Description Port number must be within the range of ports for the specific director model.

Action Enter a port number within the correct range.

Message **Invalid port number. Valid ports are (0 - 127, 132-143).**

Description Intrepid 6140 Director. Port number must be within the range of ports for the specific director model. For this model, the valid port numbers are 0 - 127 and 132-143. Ports 128-131 are not valid because they are internal ports and cannot be connected to external fiber optic cables.

Action Enter a port number within the correct range.

Message **Invalid port number. Valid ports are (0 - 63).**

Description Intrepid 6064 Director. Port number must be within the range of ports for the specific director model. For this model, the valid port numbers are 0 - 63.

Action Enter a port number within the correct range.

Message **Invalid port swap.**

Description Port swap selection is not allowed.

Action Ensure that each port selected for swap has not been previously swapped.

Message **Invalid response received from director.**

Description The director returned an invalid response.

Action Resend the firmware. If the condition persists, contact support personnel.

Message **Invalid serial number for this feature key.**

Description The serial number and the feature key did not match.

Action Ensure that the feature key being installed is specifically for this director serial number.

Message **Invalid UDP port number.**

Description UDP port number must be an integer from 1 through 65535.

Action Enter a port number from 1 through 65535.

Message **Invalid value for BB_Credit.**

Description BB_Credit must be an integer from 1 through 60.

Action Enter a number from 1 through 60.

Message **Invalid value for Low BB Credit threshold (1-99) %.**

Description *Low BB Credit Threshold* text field in *Configure Open Trunking* dialog box must have entries in the range from 1 and 99. This message only displays if the optional OpenTrunking feature is installed. Note that your message and the *Configure Open Trunking* dialog box may display *Credit Starvation Threshold* instead of *Low BB Credit Threshold*.

Action Enter a value from 1 to 99 into the *Low BB Credit Threshold* of the *Configure Open Trunking* dialog box.

Message **Invalid value for day (1 - 31).**

Description Value for day must be an integer from 1 through 31.

Action Enter a value from 1 through 31.

Message **Invalid value for E_D_TOV.**

Description Value for E_D_TOV must be an integer from 2 through 600, measured in tenths of a second.

Action Enter a value from 2 through 600.

Message **Invalid value for hour (0 - 23).**

Description Value for hour must be an integer from 0 through 23.

Action Enter a value from 0 through 23.

Message **Invalid value for minute (0 - 59).**

Description Value for minute must be an integer from 0 through 59.

Action Enter a value from 0 through 59.

Message **Invalid value for month (1 - 12).**

Description Value for month must be an integer from 1 through 12.

Action Enter a value from 1 through 12.

Message **Invalid value for R_A_TOV.**

Description Value for R_A_TOV must be an integer from 10 through 1200. Measured in tenths of a second.

Action Enter a value from 10 to 1200.

Message **Invalid value for second (0 - 59).**

Description Value for second must be an integer from 0 through 59.

Action Enter a value from 0 through 59.

Message **Invalid value for threshold (1-99)%.**

Description Value entered for each port in the *Configure Open Trunking* dialog box must be in the range from 1 to 99. This message only displays if the optional OpenTrunking feature is installed.

Action Enter a number from 1 to 99 into the *Threshold %* column of the *Configure Open Trunking* dialog box.

Message **Invalid value for year.**

Description Value for year must be a four-digit year after 1980.

Action Enter a correct four-digit value for the year.

Message **Invalid World Wide Name.**

Description World wide name must have eight two-digit hexadecimal numbers separated by colons (**xx:xx:xx:xx:xx:xx:xx:xx**).

Action Enter a worldwide name using eight two-digit hexadecimal numbers separated by colons in the format given in the message.

L

Message **Link dropped.**

Description Connection between EFC Server and the director has been lost.

Action Wait for the connection to re-establish. Link re-connects are attempted every 30 seconds.

Message **Log is currently in use.**

Description Log is in use by another Product Manager.

Action Retry the operation later.

Message **Loopback plug(s) must be installed on ports being diagnosed. Press *Next* to continue.**

Description External loopback diagnostics require an optical loopback plug to be installed.

Action Ensure that an optical loopback plug is installed in port optical transceiver before running external wrap diagnostic testing.

M

Message **Maximum number of versions already installed.**

Description The maximum number of firmware versions has been reached.

Action Delete a firmware version before adding a new firmware version.

Message **McDATA SANtegrity Feature not installed. Please contact your sales representative.**

Description The user selected Switch Binding from the Configure menu, but the optional SANtegrity feature is not installed.

Action Install the SANtegrity key through the Configure Feature Key dialog box before using Switch Binding features.

N

Message **No file was selected.**

Description Action requires you to select a file

Action Select a file.

Message **No firmware version file was selected.**

Description A file was not selected in the *Firmware Library* dialog box before an action, such as modify or send was performed.

Action Click a firmware version in the dialog box to select it, then perform the action again.

Message **No firmware versions to delete.**

Description There are no firmware versions in the firmware library to delete.

Action N/A. An informational message.

Message **Non-redundant director must be offline to install firmware.**

Description If the director has only a single CTP card, it must be offline to initiate a firmware installation.

Action Take director offline and try again.

Message **Not all of the optical transceivers are installed for this range of ports.**

Description Some ports in the specified range do not have optical transceivers installed.

Action Use a port range that is valid for the ports installed.

O

Message **OpenTrunking is not installed for this product. Please contact your sales representative.**

Description The OpenTrunking feature key has not been enabled. This message only displays if the optional OpenTrunking feature is installed.

Action Enter the feature key into the C*onfigure Feature Key* dialog box and enable the key. If you require a feature key, see your account representative.

P

Message **Performing this operation will change the current state to Offline.**

Description This operation causes the director to go offline.

Action N/A. An informational message.

Message **Performing this operation will change the current state to Online.**

Description This operation causes the director to go online.

Action N/A. An informational message.

Message **Performing this action will overwrite the date/time on the director.**

Description Warning that occurs when configuring the date and time through the *Configure Date and Time* dialog box, that the new time or date will overwrite the existing time or date set for the director.

Action Verify that you want to overwrite the current date or time.

Message **Periodic Date/Time synchronization must be cleared before enabling director clock alert.**

Description Action cannot be performed because *Periodic Date/Time Synchronization* option is active.

Action Click *Periodic Date/Time Synchronization* check box in *Configure Date and Time* dialog box (*Configure* menu) to clear check mark and disable periodic date/time synchronization.

‘

Message **Port binding was removed from attached devices that are also participating in Switch Binding.**

Description Informational message. User has removed Port Binding from attached devices, but one or more of these devices is still controlled by Fabric Binding.

Action Review the Switch Binding Membership List to determine if the devices should be members.

Message **Port cannot swap to itself.**

Description Port addresses entered in the *Swap Ports* dialog box are the same.

Action Make sure that address in the first and second port address fields are different.

Message **Port diagnostics cannot be performed on an inactive port.**

Description This displays when port diagnostics is run on a port in an inactive state.

Action Run the diagnostics on an active port.

Message **Port speeds cannot be configured at a higher rate than the director/switch speed.**

Description This displays when you configure a port to 2 GB/sec and the director speed is set to 1 Gb/sec.

Action Set the director speed to 2 Gb/sec in the *Configure Operating Parameter* dialog box.

Message **Product Manager error <number>.**

Description The director Product Manager encountered an internal error and cannot continue.

Action Report the problem to support personnel.

Message **Product Manager instance is currently open.**

Description A Product Manager window is currently open.

Action Informational message only.

R

Message **R_A_TOV must be greater than E_D_TOV.**

Description R_A_TOV must be greater than E_D_TOV.

Action Change one of the values so that R_A_TOV is greater than E_D_TOV.

Message **Resource is unavailable.**

Description The specified operation cannot be performed because the product is unavailable.

Action Verify that the EFC Server-to-product link is up. If the link is up, the EFC Server may be busy. Try the operation again later.

S

Message **Send firmware failed.**

Description Send firmware operation has failed.

Action Retry the operation. If the condition persists, contact support personnel.

Message **SNMP trap address not defined.**

Description An SNMP trap address must be defined if a community name is defined.

Action Define an SNMP address.

Message **Stop diagnostics failed. The test is already running.**

Description Diagnostics for the port was not running and the *Stop* was selected on the *Port Diagnostics* dialog box. Diagnostics quit for the port for some reason, but the *Stop* button remains enabled.

Action Verify port operation. Retry diagnostics for port and select *Stop* from the dialog box. If problem persists, contact your service representative.

Message **Stop diagnostics failed. The test was not running.**

Description The action to stop diagnostics failed because the test was not running.

Action Informational message.

Message **Switch Binding was removed from attached devices that are also participating in Port Binding. Please review the Port Binding Configuration.**

Description The device WWNs were removed from the director's Switch Membership List (SANtegrity Switch Binding feature), but you should note that one or more of these devices still has security control in port binding.

Action Verify that the security level for each device is as required by reviewing the Bound WWN list in the *Configure Ports* dialog box.

Message **System diagnostics cannot run. The Operational Status is invalid.**

Description System diagnostics cannot run on switches with failed ports.

Action Replace failed ports.

T

Message **The add firmware process has been aborted.**

Description User has ended the add firmware process.

Action N/A. An informational message.

Message **The data collection process failed.**

Description An error occurred in the data collection process.

Action Contact support personnel.

Message **The data collection process has been aborted.**

Description User has ended the data collection process.

Action N/A. An informational message.

Message **The default zone must be disabled to configure.**

Description The message displays when the user attempts to change the interoperability mode to open fabric and the default zone is enabled

Action Disable the default zone and repeat the operation.

Message **The director did not accept the request.**

Description The director did not handle the action.

Action Try action again. If problem persists, contact your support representative.

Message **The director did not respond in the time allowed.**

Description A time out was reached waiting for the switch to respond to the action.

Action Try action again.

Message **The director is busy saving maintenance information.**

Description Director is busy with a maintenance operation.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **The director must be offline to change the Management Style.**

Description The firmware level is at 6.0 or below, and the user attempted to change the Management Style.

Action Select Set Online State from the Maintenance menu and click Set Offline. Then change the management style. Set the director back online when finished.

Message **The EFC Server is busy processing a request from another Product Manager**

Description The EFC Server could not process the current request because it is busy handling a request from another Product Manager.

Action Retry the operation later. If the condition persists, contact support personnel.

Message **The firmware file is corrupted.**

Description A firmware file has corrupt data.

Action Contact support personnel.

Message **The firmware version already exists.**

Description Firmware version already exists in the database.

Action N/A. An informational message.

Message **The following parameters cannot be disabled while Enterprise Fabric Mode is active: Insistent Domain ID, Rerouting Delay, Domain RSCN's.**

Description User attempted to disable these parameters in the Configure Switch Parameters dialog box while Enterprise Fabric Mode is enabled.

Action Disable Enterprise Fabric Mode through the Enterprise Fabric Mode dialog box in the EFC Manager, then disable the parameters.

Message **The IPL configuration cannot be deleted.**

Description Deletion of the IPL address configuration was attempted and was not allowed.

Action Cancel the operation.

Message **The link to the director is not available.**

Description The link from the EFC Server to the director is not available.

Action Check Ethernet connection.

Message **The maximum number of address configurations has been reached.**

Description The maximum number of saved address configurations has been reached.

Action Delete configurations no longer needed to allow new configuration to be saved.

Message **The optical transceiver is not installed.**

Description No information available for a port that is not installed.

Action Ensure the optical transceiver is installed and fully seated.

Message **This feature has not been installed. Please contact your sales representative.**

Description Indicator that the feature has not been installed on this director.

Action Contact your sales representative to obtain the desired feature.

Message **This feature key does not include all of the features currently installed and cannot be activated while the director is online.**

Description The feature set currently installed for this system contains features that are not being installed with the new feature key. To activate the new feature key, you must set the director offline. Activating the new feature set, however, will remove current features not in the new feature set.

Action Set the director offline through the Set Online State dialog box, then activate the new feature key using the Configure Feature Key dialog box.

Message **This feature key does not include all of the features currently installed. Do you want to continue with feature key activation?**

Description The feature set currently installed for this system contains features that are not being installed with the new feature key.

Action Click *Yes* to activate the feature key and remove current features not in the new feature set or *No* to cancel.

Message **Threshold alerts are not supported on firmware earlier than 01.03.00.**

Description Threshold alerts are not supported in firmware releases before 1.03.00.

Action Informational message.

U

Message **Unable to change to incompatible firmware release.**

Description The user tried to download a firmware release that is not compatible with the current product configuration.

Action Refer to the release notes or contact customer support.

Message **Unable to save data collection file to destination.**

Description Could not save data collection file to the specified drive (hard drive, network).

Action Retry the operation. If the condition persists, contact support personnel.

Y

Message **You do not have rights to perform this action.**

Description User does not have the rights to perform this action.

Action An informational message.

Glossary

The following cross-references are used in this glossary:

Contrast with. This refers to a term that has an opposite or substantively different meaning.

See. This refers the reader to another keyword or phrase for the same term.

See also. This refers the reader to definite additional information contained in another entry.

A

access control List of all devices that can access other devices across the network and the permissions associated with that access. *See also* persistent binding and zoning.

active FRU A field-replaceable unit that is currently operating as the active and not the backup FRU.

active zone set Single zone set that is active in a multiswitch fabric. It is created when you enable a specified zone set. This zone set is compiled by checking for undefined zones or aliases.

agent Software that processes queries on behalf of an application and returns replies.

alarm SNMP message notifying an operator of a network or device problem.

ALPA Arbitrated Loop Physical Address.

ANSI American National Standards Institute: an organization that provides voluntary standards in the United States.

application-specific integrated circuit (ASIC) A circuit designed for a specific application or purpose, such as implementing the lower-layer Fibre Channel protocol (FC-0). ASICs differ from general purpose devices such as memory chips or microprocessors.

alias server Fabric software facility that supports multicast group management.

arbitrated loop One of the three connection topologies offered by Fibre Channel. Up to 126 node ports and one fabric port can communicate without the need for a separate switched fabric. *See also* point to point.

arbitration Process of selecting one device from a collection of devices that request service simultaneously.

audit log Log summarizing actions (audit trail) made by the user.

authentication Verification of identity for a person or process.

B

backplane The backplane provides 48 VDC power distribution and connections for all logic cards.

backup FRU When an active FRU fails, an identical backup FRU takes over operation automatically (failover) to maintain switch and Fibre Channel link operation.

beaconing Use of light-emitting diodes on ports, port cards, field-replaceable units, and switches to aid in the fault-isolation process; when enabled, active beaconing will cause LEDs to flash for faulty components.

BB_Credit *See* buffer-to-buffer credit.

ber *See* bit error rate.

bidirectional In Fibre Channel, the capability to simultaneously communicate at maximum speeds (100 Mbps) in both directions over a link.

bit error rate A comparison of the number of bits received incorrectly by a device to the total number of bits transmitted.

blocked port Devices communicating with the port are prevented from logging into the switch or communicating with other devices attached to the switch. A blocked port continuously transmits the offline sequence.

bridge Device that connects and passes packets between two network segments that use the same communications protocol.

broadcast Send a transmission to all N_Ports on a fabric.

broadcast frames Data packet, also known as a broadcast packet, whose destination address specifies all computers on a network. *See also* multicast.

buffer Storage area for data in transit. Buffers compensate for differences in processing speeds between devices.

buffer-to-buffer credit BB_Credit. (1) The maximum number of receive buffers allocated to a transmitting node port (N_Port) or fabric port (F_Port). Credit represents the maximum number of outstanding frames that can be transmitted by that N_Port or F_Port without causing a buffer overrun condition at the receiver. (2) The maximum number of frames a port can transmit without receiving a receive ready signal from the receiving device. BB_Credit can be adjustable to provide different levels of compensation.

C

CHPID *See* channel path identifier.

call-home Product feature which enables the EFC Server to automatically dial out to a support center and report system problems. The support center server accepts calls from the EFC Server, logs reported events, and can notify one or more support center representatives.

channel Point-to-point link that transports data from one point to the other.

channel path — A single interface between a central processor and one or more control units along which signals and data can be sent to perform I/O requests.

channel path identifier — In a channel subsystem, a value assigned to each installed channel path of the system that uniquely identifies that path to the system.

class of Fibre Channel service — Defines the level of connection dedication, acknowledgment, and other characteristics of a connection.

Class F Fibre Channel service — Used by switches to communicate across interswitch links (ISLs) to configure, control, and coordinate a multiswitch fabric.

Class 2 Fibre Channel service — Provides a connectionless (not dedicated) service with notification of delivery or nondelivery between two N_Ports. In-order delivery of frames is not guaranteed.

Class 3 Fibre Channel service — Provides a connectionless (not dedicated) service without notification of delivery or nondelivery between two N_Ports. Also known as datagram.

community profile — Information that specifies which management objects are available to what management domain or SNMP community name.

concurrent firmware upgrade — The CTP card provides two nonvolatile memory regions. Because two firmware versions can be stored on the card, firmware is upgraded without disrupting switch operation.

concurrent maintenance — Ability to perform maintenance tasks, such as removal or replacement of field-replaceable units, while a hardware product is operating.

configuration data — Configuration data includes: identification data, port configuration data, operating parameters, SNMP configuration, and zoning configuration. A configuration backup file is required to restore configuration data if the CTP card in a nonredundant switch or switch is removed and replaced.

configuration report — An ASCII text file containing all current user-definable configuration options.

connectionless — Nondedicated link. Typically used to describe a link between nodes which allows the switch to forward Class 2 or Class 3 frames as

resources (ports) allow. Contrast this to the dedicated bandwidth that is required in a Class 1 Fibre Channel Service point-to-point link.

connector *See* optical fiber connector.

control processor card Circuit card that contains the switch microprocessor. The CTP card also initializes hardware components of the system after power-on. A 10 Mbps RJ-45 twisted pair connector is located on the CTP card to connect to the Ethernet LAN and communicate with the EFC Server or a specific management station.

control unit A hardware unit that controls the reading, writing, or displaying of data at one or more input/output units.

control unit port An internal port on the CTP card that communicates with the attached IBM FICON or similar processor channels to report error conditions and link initialization.

CRC *See* cyclical redundancy check.

CTP *See* control processor card.

CUP *See* control unit port.

cyclical redundancy check System of error checking performed at both the sending and receiving station using the value of a particular character generated by a cyclic algorithm. When the values generated at each station are identical, data integrity is confirmed.

D

DASD Direct access storage device such as a disk drive.

data directory Critical information for all managed products (including directors and switches). Information stored here includes: all EFC Manager configuration data (product definitions, user names, passwords, user rights, nicknames, session options, SNMP trap recipients, e-mail recipients, and Ethernet event notifications); all log files (EFC manager logs and individual Product Manager logs); zoning library (all zone sets and zone definitions); firmware library; call-home settings (phone numbers and dialing options); configuration data for

each managed switch (stored on the EFC Server and in NV-RAM on each switch).

datagram *See* Class 3 Fibre Channel service.

default Pertaining to an attribute, value, or option that is assumed when none is explicitly specified.

default zone Contains all attached devices that are not members of a separate zone.

destination address Address identifier that indicates the targeted destination of a data frame.

device Product, connected to a managed switch, that is not controlled directly by the Product Manager. *See also* node.

diagnostics Procedures used by computer users and service personnel to diagnose hardware or software error conditions.

dialog box Dialog box is a window containing informational messages or data fields to be modified or filled in with desired options.

D_ID *See* destination address.

director An intelligent Fibre Channel switching device providing any-to-any port connectivity between nodes (end devices) on a switched fabric. The director sends data transmissions (data frames) between nodes in accordance with the address information present in the frame headers of those transmissions.

DNS name Domain name system or domain name service. Host or node name for a device or managed product that is translated to an IP address through a domain name server.

domain ID Number (1 through 31) that uniquely identifies a switch in a multiswitch fabric. A distinct domain ID is automatically allocated to each switch in the fabric by the principal switch.

E

E_Port *See* expansion port.

E_D_TOV *See* error-detect time-out value.

EFC Enterprise fabric connectivity.

EFC Product Manager The applications provide a graphical user interface (GUI) and management services, and implement web and other server functions.

EFC Server PC shipped with a product to run the EFC Manager and EFC Product Manager applications.

EFC Management Services Software application that provides back-end product-independent services to the EFC Manager application. EFC Management Services runs only on the EFC Server (and cannot be downloaded to remote workstations).

EMS *See* EFC Management Services.

Enterprise Fabric Connectivity Manager Software application that is the system management framework providing the user interface for managing McDATA Fibre Channel connectivity products. The EFC Manager can run both locally on the EFC Server and remotely on a user workstation.

error-detect time-out value E_D_TOV defines the time the switch waits for an expected response before declaring an error condition.

error message Indication that an error has been detected. *See also* information message and warning message.

Ethernet A widely implemented local area network (LAN) protocol that uses a bus or star topology and serves as the basis for the IEEE 802.3 standard, which specifies the physical and software layers. Baseband LAN allows multiple station access to the transmission medium at will without prior coordination and which avoids or resolves contention.

ethernet hub A device used to connect the EFC Server and the switches it manages.

event code A numeric code that displays in the event log. This code provides information on system failures, such as hardware failures, failure locations, or general information on normal system events.

event log Record of significant events that have occurred on the switch, such as FRU failures, degraded operation, and port problems.

expansion port Physical interface on a Fibre Channel switch within a fabric that attaches to an expansion port (E_Port) on another Fibre Channel switch to form a multiswitch fabric. *See also* segmented E_Port.

explicit fabric login Data field size, supported by an F-Port, that is agreed upon during fabric login.

F

fabric Entity that interconnects N_Ports and is capable of routing (switching) Fibre Channel frames using the destination ID information in the Fibre Channel frame header accompanying the frames.

fabric address notification FAN. A message that informs all NL_Ports of the address of the FL_Port. Allows LIP processing to not be disruptive to FC traffic on devices that support FAN. *See* loop initialization primitive.

fabric element Any active switch or node in a switched fabric.

fabric port Physical interface within the fabric that connects to an N_Port through a point-to-point full duplex connection.

fabric services Fabric services implements the various Fibre channel services that are described in the standards. These services includes the Fabric controller (login server), name server, and management server.

failover Automatic and nondisruptive transition of functions from an active FRU that has failed to a backup FRU.

FAN *See* fabric address notification.

FCC-IOC *See* Fibre Channel I/O controller.

FE-MIB *See* Fibre Channel Fabric Element.

feature key A string of alphanumeric characters consisting of both uppercase and lowercase. The following is an example of a feature key format: XxXx-XXxX-xxXX-xX.

fiber optics Branch of optical technology concerned with the transmission of light pulses through fibers made of transparent materials such as glass, fused silica, and plastic.

fibre Physical media types supported by the Fibre Channel specification, such as optical fiber, twisted pair, and coaxial cable.

Fibre Channel Integrated set of standards recognized by ANSI which defines specific protocols for flexible information transfer. Logically, a point-to-point serial data channel, structured for high performance.

Fibre Channel fabric element Any device linked to a fabric. Information about these devices is recorded in a management information base (MIB) which can be accessed by fabric management software.

Fibre Channel I/O controller Controls the embedded Fibre Channel port and configures the ports' ASICs.

fibre port module card Each fiber port module card provides four Fibre Channel connections through duplex small form factor pluggable (SFP) fiber-optic transceivers.

field-replaceable unit Assembly removed and replaced in its entirety when any one of its components fails.

firmware Embedded program code that resides and executes on the switch.

FLASH memory A computer chip with a read-only memory that retains its data when the power is turned off and that can be electronically erased and reprogrammed without being removed from the circuit board.

F_Port *See* fabric port.

frame A variable-length packet of data that is transmitted in frame relay technology.

FRU *See* field-replaceable unit.

Fx_Port A configurable port type that restricts a port to operate either as an F_Port or FL_Port.

G

gateway A multi-homed host used to route network traffic from one network to another, and to pass network traffic from one protocol to another.

gateway address A unique string of numbers (in the format xxx.xxx.xxx.xxx) that identifies a gateway on the network.

GBIC GigaBit Interface Converter. A removable module that converts an electrical serial data stream to an optical or amplified electrical serial data stream. Contains connector for attaching fiber optic cable.

generic port Also known as G_Port. Physical interface on a switch that can function either as a fabric port (F_Port) or an extension port (E_Port) depending on the port type to which it connects.

G_Port *See* generic port.

GUI Graphical User Interface.

Gx_Port A configurable port type that restricts a port to operate either as an F_Port, FL_Port, or E_Port.

H

hardware log Record of FRU insertions and removals in the switch.

hardware management console The console runs the Hardware Management Console application (HWMCA), and is the operations and management PC platform for FICON and zSeries servers.

HBA *See* host bus adapter.

heterogeneous fabric A fabric with both McDATA and non-McDATA products.

homogeneous fabric A fabric consisting of only McDATA products.

hop count The number of hops a unit of information traverses in a fabric.

hexadecimal A number system with a base of 16.

high availability A performance feature characterized by hardware component redundancy and hot-swappability (enabling non-disruptive maintenance). High-availability systems maximize system uptime while providing superior reliability, availability, and serviceability.

hop Data transfer from one node to another node.

hop count ISL connections.

host bus adapter Logic card that provides a link between the server and storage subsystem, and that integrates the operating systems and I/O protocols to ensure interoperability.

hot-swapping Removing and replacing a device's components while the device continues to operate normally.

hub In Fibre Channel, a device that connects nodes into a logical loop by using a physical star topology.

I

IML *See* initial machine load.

inband management Management of the switch through Fibre Channel connection to a port card.

information message Message telling a user that a function is performing normally or has completed normally. *See also* error message and warning message.

initial machine load Also known as IML. Hardware reset for the CTP card on the switch. It does not affect other hardware. It is initiated by pushing the reset (RST) button on the machine's front panel.

initial program load Process of initializing the device and causing the operating system to start. Initiated through a menu in the Product Manager.

input/output configuration The collection of channel paths, control units, and I/O devices that attaches to the FICON or zSeries processor.

input/output configuration program A program that defines all available I/O devices and channel paths to an IBM FICON or zSeries processor system. Replaced by the

Hardware Configuration Definition Program starting with MVS/ESA Version 4.0.

interface Hardware, software, or both, linking systems, programs, or devices.

Internet Protocol The TCP/IP standard protocol that defines the IP datagram as the unit of information passed across an internet and provides the basis for connectionless, best-effort packet delivery service. IP includes the ICMP control and error message protocol as an integral part.

internet protocol address Unique string of numbers (in the format xxx.xxx.xxx.xxx) that identifies a device on a network.

interoperability Ability to communicate, execute programs or transfer data between various functional units over a network.

interswitch link Also known as ISL. Physical E_Port connection between two switches in a fabric.

I/O configuration *See* input/output configuration.

IOCDS A data set that contains an I/O configuration definition built by the IOCP.

IOCP *See* input/output configuration program.

IP address *See* internet protocol address.

IPL *See* initial program load.

ISL *See* interswitch link.

J

jumper cable Optical cable that provides physical attachment between two devices or between a device and a distribution panel. *Contrast with* trunk cable.

L

laser Light Amplification through Simulated Emissions of Radiation. A device that uses the oscillation of atoms or molecules between energy levels to generate a narrow, finely focused beam of light. The light has a single wavelength or narrow spectrum of wavelengths and is matched in phase and frequency.

LED Light-emitting diodes (LEDs) on switch FRUs and the front bezel that provide visual indicators of hardware status or malfunctions.

latency When used in reference to a Fibre Channel switching device, latency refers to the amount of time elapsed between receipt of a data transmission at a switch's incoming F_Port (from the originating node port) to retransmission of that data at the switch's outgoing F_Port (to the destination N_Port). The amount of time it takes for data transmission to pass through a switching device.

LIN *See* link incident.

link Physical connection between two devices on a switched fabric.

link incident A link incident is a problem detected on a fiber optic link, like the loss of light, invalid sequences and other problems.

link incident alerts A user notification, such as a graphic symbol in the hardware view that indicates that a link incident has occurred.

LIP *See* loop initialization primitive.

load balancing Ability to evenly distribute traffic over multiple interswitch links within a fabric. Load balancing on McDATA switches takes place automatically.

log A record, as of the performance of a machine or the progress of an undertaking.

logical unit number Also known as LUN. In Fibre Channel addressing, a logical unit number is a number assigned to a storage device which, in combination with the storage device's node port's world-wide name, represents a unique identifier for a logical device on a storage area network.

loop initialization primitive LIP. In an arbitrated loop device, a process by which devices connected to hub ports (H_Ports) on the arbitrated loop device notify other devices and the switch of the presence in the loop by sending LIP sequences and subsequent frames through the loop. This process allows linked arbitrated loop devices to perform fabric loop port (FL_Port) arbitration as they link through hub ports.

loopback plug In a fiber optic environment, a type of duplex connector used to wrap the optical output signal of a device directly to the optical input.

loopback test Test that checks attachment or control unit circuitry, without checking the mechanism itself, by returning the output of the mechanism as input.

LUN *See* logical unit number.

M

MAC address *See* Media Access Control address.

maintenance port Connector on the switch operator panel where a PC running an ASCII terminal emulator can be attached or dial-up connection made for specialized maintenance support.

managed product Hardware product that can be managed with the EFC Product Manager. For example, the Sphereon 3216 and Sphereon 3232 Switches are managed products. *See also* device.

management information base Related set of software objects (variables) containing information about a managed device and accessed via SNMP from a network management station.

management session Management session exists when a user logs on to the EFC Manager. EFC can support multiple concurrent management sessions. The user must specify the network address of the EFC Manager's server at logon time.

Media Access Control address Hardware address of a node (device) connected to a network.

MIB *See* management information base.

multicast Delivery of a single transmission to multiple destination N_Ports. Can be one to many or many to many. All members of the group are identified by one IP address.

multiswitch fabric Fibre Channel fabric created by linking more than one fabric switching device within a fabric.

N

name server Program that translates names from one form into another. Domain name servers (DNS) translate domain names into IP addresses.

name server zoning N_Port access management that allows N_Ports to communicate if and only if they belong to a common name server zone.

network address Name or address that identifies a managed product, such as the Sphereon 3216 or Sphereon 3232 Switches, on a TCP/IP network. The network address can be either an IP address in dotted-decimal notation (containing four three-digit octets in the format xxx.xxx.xxx.xxx), or a domain name (as administered on a customer network).

nickname Alternate name assigned to a worldwide name for a node or switch in the fabric.

node In Fibre Channel terminology, mode refers to an end device (server or storage device) that is or can be connected to a switched fabric.

node port Physical interface within an end device which can connect to an F_Port on a switched fabric or directly to another N_Port (in point-to-point communications).

nondisruptive maintenance Ability to service FRUs (including maintenance, installation, removal and replacement) while normal operations continue without interruption. *See also* concurrent maintenance.

N_Port *See* node port.

O

offline sequence Sequence sent by the transmitting port to indicate that it is attempting to initialize a link and has detected a problem in doing so.

offline state When the switch is in the offline state, all the installed ports are offline. The ports transmit an OLS (offline sequence) and they cannot accept a login for connection from an attached device. *Contrast with* online state.

OLS *See* offline sequence.

online state When the switch is in the online state, all of the unblocked ports are allowed to login to the fabric and begin communicating. Devices can connect to the switch if the port is not blocked and can communicate with another attached device if both devices are in the same zone or if the default zone is enabled. *Contrast with* offline state.

Open Systems Management Server An optional feature that can be enabled on the director or switch through the Product manager application. When enabled, host control and management of the director or switch are provided through an open systems interconnection (OSI) device attached to a director or switch port.

OpenTrunking OpenTrunking is a licensed optional feature that enables load balancing of traffic flows. OpenTrunking monitors the average speed of data traffic through a flow. In the event of traffic congestion, or if traffic on an ISL is disproportionate, a traffic flow is rerouted to a less congested ISL. See also interswitch link.

operating state (switch) The operating states are described as follows:

Online - when the switch is set online, an attached device can log in to the switch if the port is not blocked. Attached devices can communicate with each other if they are configured in the same zone.

Offline - when the switch is set offline, all ports are set offline. The switch transmits the offline sequence (OLS) to attached devices, and the devices cannot log in to the switch.

operating state (port) Can be beaconing, invalid attachment, link incidents, link resets, LIPS, no light, not operational, online, offline, segmented E_Port, port failure, or testing.

operating status (switch) Can be online, offline, coming online, or going offline.

optical cable Fiber, multiple fibers, or a fiber bundle in a structure built to meet optical, mechanical, and environmental specifications. *See also* jumper cable, optical cable assembly, and trunk cable.

optical cable assembly Optical cable that is connector-terminated. *See also* jumper cable and optical cable.

optical fiber connector Hardware component that transfers optical power between two optical fibers or bundles and is designed to be repeatedly connected and disconnected.

out-of-band management Transmission of management information using frequencies or channels other than those routinely used for information transfer.

P

packet Logical unit of information (usually in the form of a data frame) transmitted on a network. It contains a header (with all relevant addressing and timing information), the actual data, and a trailer (which contains the error checking function, usually in the form of a cyclic redundancy check), and frequently, user data.

panel The main Product Manager window is divided into four main panels: title panel, menu bar, status bar, and view panel. Use features in these panels to configure switch operation, monitor performance, and access maintenance features.

password Unique string of characters known to the computer system and to a user who must specify it to gain full or limited access to a system and to the information stored within it.

path In a network, any route between any two ports.

persistent binding A form of server-level access control that uses configuration information to bind a server to a specific Fibre Channel storage volume (or logical device) using a unit number.

point-to-point A Fibre Channel topology which involves a dedicated link that connects only two stations. *See also* arbitrated loop.

port Receptacle on a device to which a cable leading to another device can be attached.

port binding Configuring a specific switch or director port to communicate exclusively with an attached device.

port name Name that the user assigns to a particular port through the Product Manager.

POST *See* power-on self-test.

power-on self-test Series of self-tests executed each time the unit is booted or reset.

preferred domain ID Domain ID that a switch is assigned by the principal switch in a switched fabric. The preferred domain ID becomes the active domain ID except when configured otherwise by the user.

preventive service planning bucket Collected problems after early ship of an IBM product.

principal switch In a multiswitch fabric, the switch that allocates domain IDs to itself and to all other switches in the fabric. There is always one principal switch in a fabric. If a switch is not connected to any other switches, it acts as its own principal switch.

product manager Application that implements the management user interface for the switch.

product name User-configurable identifier assigned to a managed product. Typically, this name is stored on the product itself. For the switch, the product name can also be accessed by an SNMP manager as the system name.

protocol A standard procedure for regulating data transmission between computers.

PSP bucket *See* preventive service planning bucket.

R

R_A_TOV *See* resource allocation time-out value.

redundancy Performance characteristic of a system or product whose integral components are backed up by identical components to which operations will automatically failover in the event of a component failure. Redundancy is a vital characteristic of virtually all high-availability (24 hr./7 days per week) computer systems and networks.

redundant FRU SFP LC transceivers, power supplies, and cooling fans that can be removed or replaced without disrupting switch or Fibre Channel link operation.

remote access link Connection to a device or program on a computer network via a (geographically) remote workstation.

remote notification A process by which a system is able to inform remote users and/or workstations of certain classes of events that occur on the system. E-mail notification and the configuration of SNMP trap recipients are two examples of remote notification programs that can be implemented.

remote user workstation Workstation, such as a PC, using EFC Manager and Product Manager software that can access the EFC Server over a LAN connection.

rerouting delay Enabling rerouting delay ensures that frames are delivered in order through the fabric to their destination. If there is a change to the fabric topology that creates a new path (for example, a new switch is added to the fabric), frames may be routed over this new path if its hop count is less than a previous path with a minimum hop count. This may result in frames being delivered to a destination out of order since frames sent over the new, shorter path may arrive ahead of older frames still in route over the older path.

resource allocation time out value R_A_TOV is a value used to time out operations that depend on the maximum possible time that a frame could be delayed in a fabric and still be delivered.

S

SAN *See* storage area network.

SANpilot A management interface embedded on the switch's code which offers features similar to, but not as robust as, the EFC Manager and Product Manager.

SC Subscriber connectors.

segmented E_Port E_Port that has ceased to function as an E_Port within a multiswitch fabric due to an incompatibility between the fabrics that it joins. *See also* expansion port.

SEL System error light.

SFP transceivers *See* small form factor transceivers.

small form factor pluggable (SFP) transceivers Laser-based optical transceivers for a wide range of networking applications requiring high data rates. The transceivers, which are designed for increased densities, performance, and reduced power, are well-suited for Fibre Channel applications.

simple mail transfer protocol The standard e-mail protocol on the Internet. It is a TCP/IP protocol that defines the message format and the message transfer agent, which stores and forwards the mail.

SMTP *See* simple mail transfer protocol.

SNMP Simple Network Management Protocol. Specifies a mechanism for network management that is complete, yet simple. Information is exchanged between agents, which are the devices on the network being managed, and managers, which are the devices on the network through which the management is done.

SNMP community Also known as SNMP community string. SNMP community is a cluster of managed products (in SNMP terminology, hosts) to which the server or managed product running the SNMP agent belongs.

SNMP community name The name assigned to a given SNMP community. Queries from an SNMP management station to a device running an SNMP agent will only elicit a response if those queries are addressed with the correct SNMP community name.

SNMP management station An SNMP workstation console used to oversee the SNMP network.

SSP *See* system services processor.

status bar This bar, located below the navigation control panel, displays a status symbol that indicates the current state of the switch.

storage area network A high-performance data communications environment that interconnects computing and storage resources so that the resources can be effectively shared and consolidated.

subnet mask A method of representing the portion of the IP network address that is devoted to subnet addresses (as opposed to the portions of the address that refer to individual hosts or to the organizational network overall).

switchover Changing a backup FRU to the Active state, and the active FRU to the Backup state.

switch priority Value configured into each switch in a fabric that determines its relative likelihood of becoming the fabric's principal switch.

system services processor Controls the RS-232 maintenance port and the Ethernet port of a Fibre Channel switch.

T

topology Logical and/or physical arrangement of stations on a network.

trap Unsolicited notification of an event originating from a SNMP managed device and directed to an SNMP network management station.

trap host SNMP management workstation that is configured to receive traps.

trunk cable Cable consisting of multiple fiber pairs that do not directly attach to an active device. This cable usually exists between distribution panels and can be located within, or external to, a building. *Contrast with* jumper cable.

U

unblocked port Devices communicating with an unblocked port can log in to the switch and communicate with devices attached to any other unblocked port (assuming that this is supported by the current zoning configuration).

unicast Communication between a single sender and a single receiver over a network. Compare to *multicast* (communication between a single sender and multiple receivers) and *anycast* (communication between any sender and the nearest of a group of receivers). Similar in meaning to *point-to-point communication*.

uniform resource locator A standard way of specifying the location of an object, typically a web page, on the Internet. URLs are the form of address used on the world-wide web. They are used in HTML documents to specify the target of a hyperlink which is often another HTML document (possibly stored on another computer).

URL *See* uniform resource locator.

user rights The EFC Manager's system administrator can assign levels of access, or "User Rights," to Product Manager users through the EFC Manager application.

V

vital product data System-level data stored by the backplane in the electrically erasable programmable read-only memory. This data includes serial numbers and identifies the manufacturer.

VPD *See* vital product data.

W

warning message Indication that a possible error has been detected. *See also* error message and information message.

window A scrollable viewing area on screen. A window may refer to a part of the application, such as the scrollable index window or the text window in the electronic versions of this database, or it may refer to the entire application in a window.

world-wide names Eight byte address that uniquely identifies a switch, or a node (end device), even on global networks.

wrap plug *See* loopback plug.

WWN *See* world-wide names.

Z

zone Set of devices that can access one another. All connected devices may be configured into one or more zones. Devices in the same zone can see each other. Those devices that occupy different zones cannot.

zone member Specification of a device to be included in a zone. A zone member can be identified by the port number of the switch to which it is attached or by its device (or HBA) world wide name. In multiswitch fabrics, identification of end-devices/nodes by world wide name is preferable.

zone set *See* zone.

zoning Grouping of several devices by function or by location. All devices connected to a connectivity product, such as the switch, may be configured into one or more zones. *See also* zone.

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